February 1947

Chemical Industries

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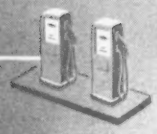
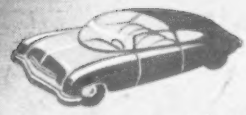


SOLVAY

TRADE MARK REG. U. S. PAT. OFF.



PRODUCTS FOR THE PETROLEUM INDUSTRY

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Caustic Potash
Caustic Soda
Chlorine
Soda Ash
Sodium Bicarbonate
Sodium Nitrite

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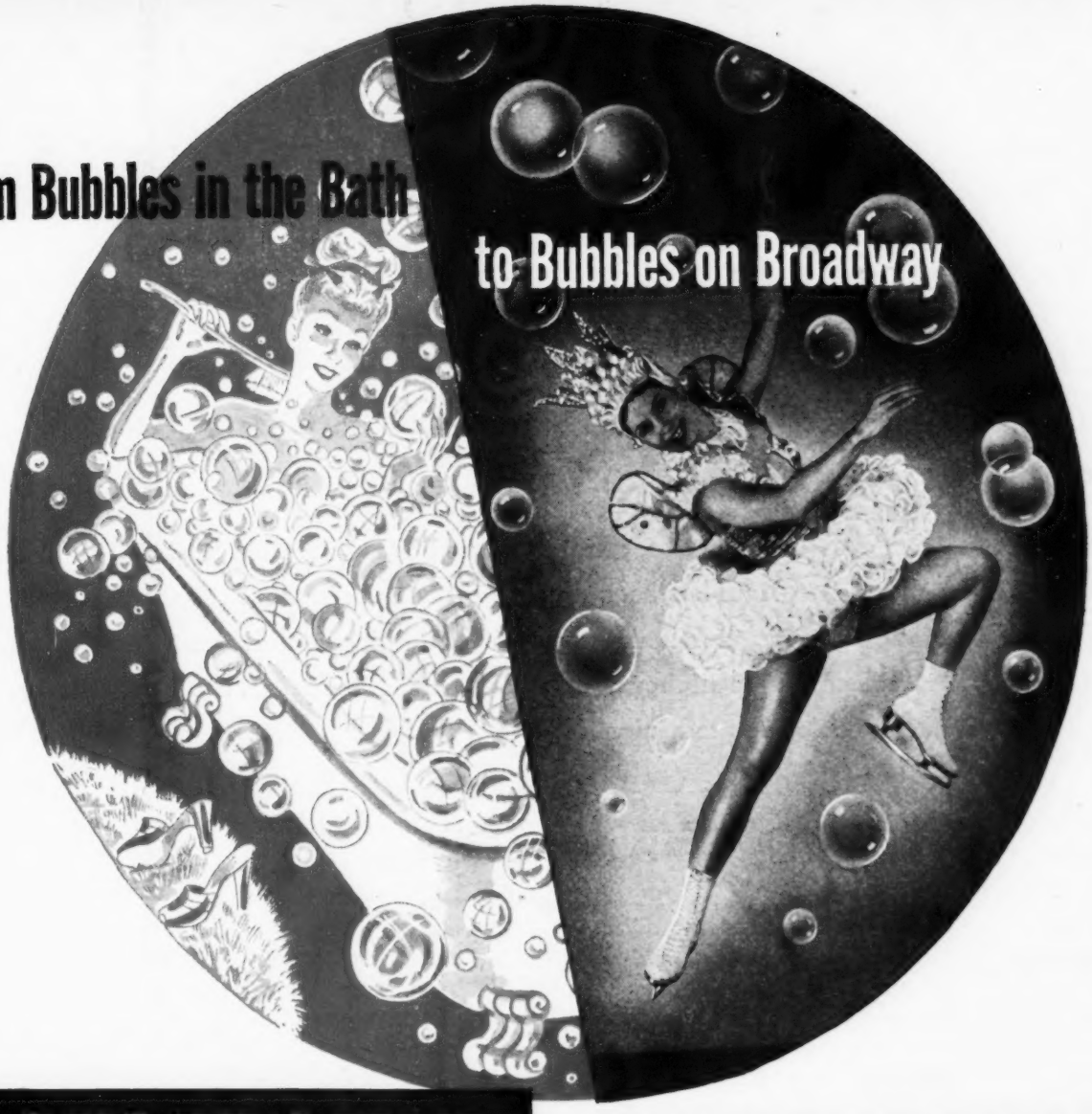

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Why you can't buy all the Caustic Soda, Soda Ash, Sodium Bicarbonate and Chlorine you want... and what to expect for 1947 and 1948.

Much has been written about the need for more Caustic Soda, Soda Ash, Sodium Bicarbonate and Liquid Chlorine but, to date, little has been done to explain the reasons for the shortage of these products. In the following Question-Answer columns, Mathieson endeavors to tell American industrialists just why they can't get all they want of these vital chemicals... and what the 1947-1948 outlook is for alkali and chlorine production.

Q. *Why are caustic soda, soda ash, sodium bicarbonate and chlorine now in short supply when there was an ample supply before the war?*

A. Expansion of the alkali-chlorine industry during the war ***was not permitted*** (except to produce an insignificant tonnage) because of the critical shortage of materials that would have been needed for this construction. However, during the same war period, alkali-consuming industries, such as aluminum, rayon, textiles, chemicals and glass food-containers, and chlorine-consuming industries, such as DDT, synthetic detergents and plastics, were allowed to expand their production or construct new facilities. These will continue as growing peace-time consumers.

Q. *Was there less alkali for consumers in 1946 than in 1945?*

A. During 1946 there was less tonnage available than in 1945 due to interruptions in production caused by coal and other strikes. If these interruptions do not recur, there should be some increase in alkali tonnage supply for 1947, but certainly not enough to meet the increased demand.

Q. *How much alkali and chlorine are being exported?*

A. Practically no chlorine. Only a negligible fraction of the pre-war tonnage of caustic soda, soda ash and sodium bicarbonate is now being shipped out of this country.

Q. *Is there any idle capacity in the alkali and chlorine industry?*

A. Only four small government-owned caustic-chlorine plants. Two of these plants have finally been leased to private industry and will be placed in operation in early '47. This additional tonnage is only a "drop in the bucket" when measured in terms of the overall shortage.

Q. *Are alkali and chlorine producers expanding their facilities?*

A. Yes, several producers, including Mathieson, are expanding facilities for one or more products. Some of this expansion was started immediately following VJ Day. But the special heavy equipment necessary (boilers, kilns and turbines) is as high on the industry shortage list as are alkali and chlorine . . . result: expansion cannot possibly be completed until late '47 or early '48.

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 60
NUMBER 2

February 1947 Contents

DEPARTMENTS

NEWS OF THE MONTH

COVER:
Bare wire enters the head of an extrusion machine and emerges through a die covered with a smooth layer of polythene.

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A MACLEAN-HUNTER publication, Horace T. Hunter, President

THE READER WRITES

Canadian Statistics Provide U. S. Breakdowns

To the Editor of Chemical Industries:

I have been following your series on Market Data Sources with great interest, and was particularly pleased to find that you have included one installment on Canadian statistics.

Certain figures published by the Dominion Bureau of Statistics are quite useful in estimating the distribution of chemical commodities in the United States. Canadian statistics on the raw materials consumed by various industries are, in most cases, reported in much greater detail than the corresponding U. S. figures. For instance, over 60 paint ingredients are reported both as to quantity and cost. The Canadian consumption of a given material can be used to estimate the U. S. consumption by making proper allowances for the totatl quantities and types of end products produced.

It is also possible in many cases to obtain the entire distribution of chemical material by adding the amounts consumed in various industries and checking this against the reported production-export-import net. Similar estimates of U. S. consumption patterns can be made by allowing for the difference in total production and for variations in the specific types of end product of each of the consuming industries.

J. R. LAKIN,
17 Maurice Ave.,
Ossining, N. Y.

"Mr. May Is Right"

To the Editor of Chemical Industries:

I very much enjoyed Earnest N. May's article "For Bosses Only" in your January issue and I think you are to be congratulated for publishing it. Mr. May is perfectly right when he says that many people in the industry, especially among the younger men, would like to point out some of these things that need correcting but are unable to do so because they feel that they would be jeopardizing their jobs. I am sure they are seconding in their minds, if not in public, all of his suggestions.

Along this same line, I came across the following poem the other day, which seems pertinent to the discussion:

ECHELONS ON HIGH

Oh, we're the little people with the power
We're the minions of the echelons on high
We're the guardians of the gate
Of the powerful and great
And all that reaches them must pass us by.

And so when any matter comes before us
To determine what the military finds
We look on it with terror
For we must not make an error
So we hold it until we've made up our minds.

For an admiral can can us in a minute
Or a general return us to the pool
Or send us to the front
Where we'd have to bear the brunt
Of the vacillations of some other fool.

And when one makes a real mistake it bounces,
And the issue does not long remain in doubt,
But with any sort of luck
We can always pass the buck
And there's no one in the world can find us out.

So we analyze each line and word and comma
And we send our letters back to be retyped;
And we call for conferences
Where we mend our little fences,
And it's only lower echelons are griped.

And the shadow's more important than the substance
And the form is more important than the end;
If we merely carp and edit
No one else will get the credit
While we make no mistakes we must defend.

Oh, we're the little people with the power
We're the minions of the echelons on high
We'll do nothing for the nation
That's not strictly regulation
So we never, never do . . . and never die!

This is supposed to have been written by an anonymous officer poet in resentment toward the general inefficiency and "empire building" he felt in the army during the war. These same feelings are also common to many young men working in large companies.

GEORGE C. GRABER,
New York, N. Y.

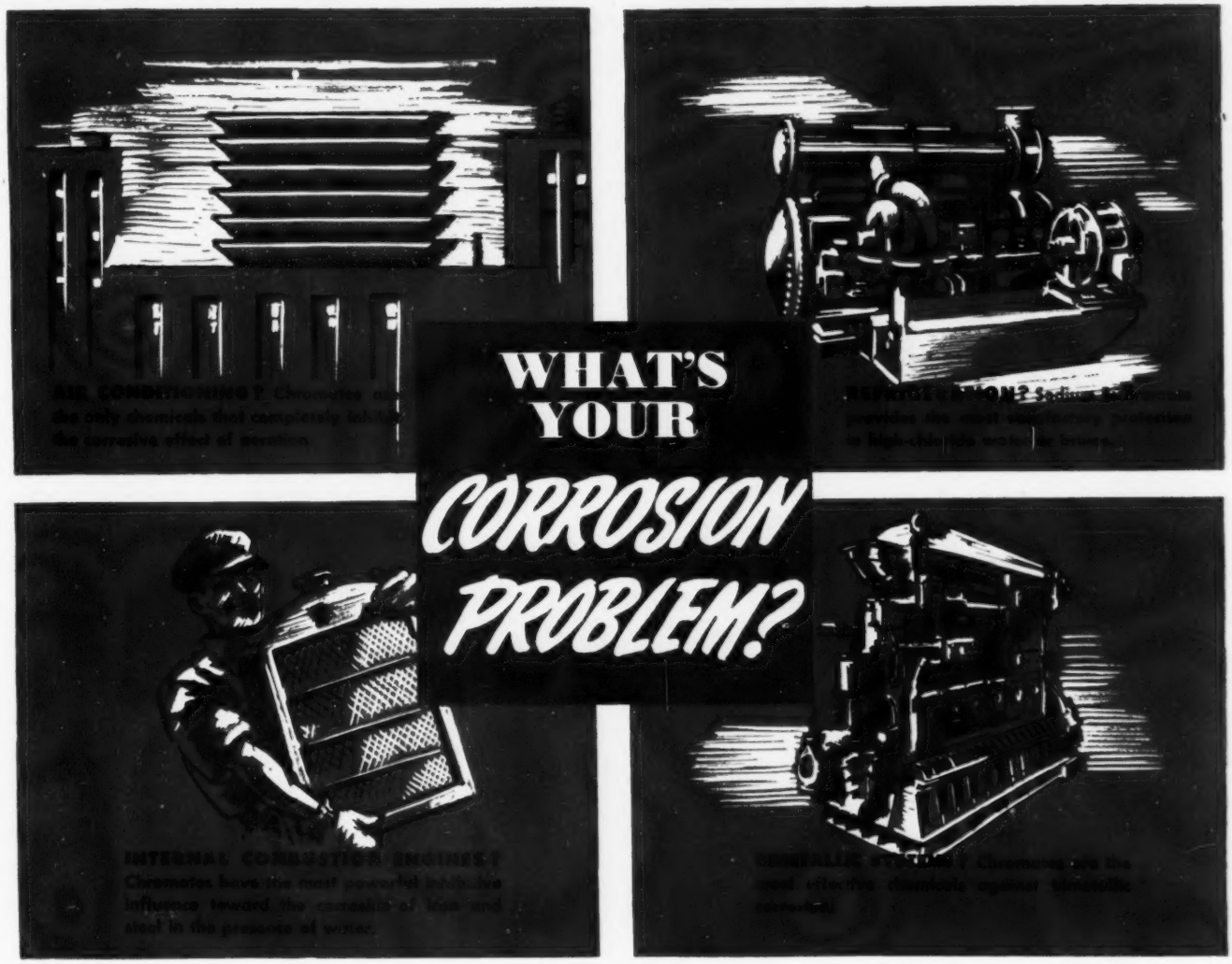
Too Much Acid

To the Editor of Chemical Industries:

I believe there is an error in the article by Mr. Lockwood on page 661 of the October, 1946, issue of CHEMICAL INDUSTRIES. It is stated that ordinary superphosphate alone will require about 7,500,000 tons of 50 deg. Be. sulfuric acid. Since 1946 production of normal superphosphate was about 7,600,000 short tons, and about one-third of a ton of 100 per cent acid is required per ton of superphosphate, requirements could not have been much more than about 2,540,000 short tons of 100 per cent acid or about 4,100,000 tons of 50 deg. Be. Double superphosphate requires slightly more acid per unit of P_2O_5, and 1946 production of this material may have required about 400,000 additional tons of 50 deg. Be. acid. Since double and normal superphosphates represent the major portion of phosphate fertilizer production, total acid requirements for phosphate fertilizers must have been under 5,000,000 tons of 50 deg. Be. acid.

F. L. JACKSON
Assistant to Technical Director
Freeport Sulphur Co.
New York, N. Y.

GIVE TO THE RED CROSS



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Some of the more recent uses of chromate corrosion inhibitors are in mercury arc rectifiers, refinery condensers and coolers, slushing compounds and hydraulic lifts. If any of these applications suggests a possibility of using chromates in one of your operations, write to our Research Dept., stating in detail your corrosion problem.

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T. N. SANDIFER *reporting*

Congress Considers Wage Drive . . . Tariff Prospects . . . Anti-Merger Law . . . ICC Rate Changes . . . Chemical Directives . . . Research Contracts

Nathan Report Fails to Impress Congress

THE YEAR STARTED on a note of caution from business observers and industry representatives here. However, this was based on an assumption widely found in the Capital that Congress would be both slow and conservative in handling the labor situation; that a new round of wage and price rises was on the way.

Since then a somewhat less pessimistic outlook has appeared. The drive for higher wages, based on a premise of no increased prices, is on, but was noticeably slowed as Congress launched the session. The braking action came from failure of the Nathan report to gain wide acceptance of its claim that a 25 percent wage increase was possible without raising prices, and from strong indications in Congress that labor legislation would be a first consideration.

With respect to the chemical industry, critics of the Nathan theme were able to show figures from private but reliable sources, that while chemical and drug profits together showed a total rise of 49 percent for the first 9 months of 1946, over the same months of 1945, positions of individual manufacturers were an entirely different matter.

This figure, including as it does the wholesale drug field with its diversified business structure, scarcely gives an accurate picture of chemical finances, in any case.

It is now realized that the outlook hinges on what Congress does to halt strikes, and to meet the portal-pay situation. Due largely to a better feeling on the part of business and industry representatives as to possibilities under these heads, there is now evident a more encouraged viewpoint in these quarters.

I. C. C. Suspends Rate Changes

PENDING FURTHER investigation, the Interstate Commerce Commission has suspended until July 31, 1947 certain proposed changes in freight rates in Eastern territory on various commodities shipped in fibreboard containers.

The proposed changes otherwise would have been effective December 31, 1946, and would have become retroactive. The changes are based on a return to pre-war shipping practice affecting shipments in such containers, which were suspended during the war as a paper conservation measure.

It was proposed to dispense with weight per 1,000 square feet of linerboard as standard (permitted as a war measure), and return to the basis used prior to November 15, 1941, which used the inside dimensions of fireboard containers, the latter being thicker in normal times.

Thus, if the change is finally approved, the war-time container with inside dimensions of 75 inches for a 65-pound box and 90 inches for the 90-pound size, would be reduced to 65 and 70 inches respectively, because of heavier specifications required, and the 5 percent tolerance in weight of linerboard now authorized, would be eliminated.

Tariff Negotiations in Offing

THE PROSPECTIVE DEMANDS for higher wages nevertheless, have quickly become a factor in proposed reciprocal trade negotiations. The Manufacturing Chemists' Association filed a comprehensive brief opposing negotiations at this stage. One of the principal objections advanced by this group was the higher wage trend in the American industry.

"The direct factory wage bill in the chemical industry in terms of percentage of total sales is between 10 to 20 percent as compared with 16 percent for all manufacturing industries," the Association reported to the State Department.

"However," this statement continued, "the technical and supervisory requirement of the chemical industry is higher than that of most other industries. The rising wage scale also directly affects raw materials on which the chemical industry depends, notably coal, where the wage bill is about 65 percent of the sales dollar. The chemical industry uses over 5 million tons of coal per year."

The brief pointed out that the actual wage and salary content of the chemical sales dollar was 27.8 cents for 1938, raw materials amounted to 25 cents, so that wages, salaries and raw materials totaled 52.8 cents in 1938. In 1946, wages and salaries amounted to 30-plus per cent of the sales dollar.

The brief cited Labor Department statistics that average hourly wage rates in the chemical industry went from $0.804 in 1940 to $1.26 in 1946 (Aug.). Some foreign chemical industry wages, by comparison, are: Great Britain, 42 cents per hour (July, 1946); Italy, 10 cents per hour, plus 10 cents per hour living allowance (October, 1946); France 28.6 cents (July, 1946); Switzerland, 53 cents (October, 1945); Netherlands, 39 cents in 1940; all foreign data being from various sources cited in the brief.

A British Ministry of Labor census of earnings shows an average weekly wage for chemical workers of $20.89 compared with $52.09 in the United States.

Any further reduction in chemical tariff rates to the credit of foreign nations whose economies are geared to substantially lower standards and to political concepts which do not permit competition on an equal basis, said the Association brief, "will place the chemical industry in a seriously disadvantageous position which will be reflected adversely in production and productive capacity," employment research, and earnings.

The brief pointed out that "Under favorable conditions, the chemical industry anticipates a large expansion in production, with a corresponding increase in employment, maintenance of a high level of wages and continuing development as a direct contribution to higher living standards."

Departmental Research Attainments Reported

IN HIS YEAR-END REPORT, the Secretary of Agriculture pointed to numerous developments of the past year in departmental research; among them were new ideas in insect control, and advancement of study of motor fuels from waste farm products, he stated.

He stressed a situation familiar to other scientific fields, however, when he warned:

"The favorable outlook for research is clouded by lack of trained personnel. During the war, we drafted boys who were preparing themselves for careers in research. Many of them are now back in

colleges and universities, but they are not ready to begin their life work. . . . We are still drafting boys from scientific and technical college courses, although more consideration is being given to such students."

The Economic Report of the President contained a table which showed corporate profits before and after taxes, 1939-46. Included were corporations, not enumerated, under the heading "industrial chemicals" which showed profits after taxes estimated at $63,000,000 for the first quarter, 1946; $66,000,000 for second quarter, and $67,000,000 for the third quarter, compared with $187,000,000 in 1945, and in 1944, and $207,000,000 in 1941.

Chemical Orders Still in Effect

THE LIST OF CONTROLS on chemicals still in effect has been steadily dwindling. Those still in force now include, as of the beginning of January: M-54 (Molasses); M-131 (Cinchona bark and alkaloids); M-300, Schedules 119, (streptomycin); 120 (Potash); and 121 (Phenolic resin).

Revoked at the year-end were a number of orders, including those limiting processing of cane alcohol, production of lead chemicals, consumption of ethyl fluid, use of tapioca flour, use of hide glue stocks, lead, and others.

Rubber manufacturers are no longer required to obtain authorization for use of natural rubber, butyl and GR-S, but are still required to obtain authority to accept delivery of rubber. They are still governed by R-1, the rubber order, as to rubber products which may be produced, and are still controlled as to delivery and consumption of natural rubber latex, still in short supply.

Inventory limits have been elevated on synthetic rubber, to 45 days at current production rates, instead of the previous 30-day maximum.

Some modifications have been made in other uses of natural rubber, such as allowance of 30 percent in building wire.

The year-end found natural and American-made rubber being consumed in manufacture of rubber products at an all-time record rate of about 100,000 tons per month, compared to pre-war 55,000 tons, the former Civilian Production Administration announced. Requirements for new rubber materials in the first quarter of this year will be even higher than the final months of 1946, it was stated.

New Research Contract Provision

AN IMPORTANT SECTION of the Agricultural Research and Marketing Act, passed at the closing session of Congress, and now being put into operation at the Department of Agriculture, authorizes the Secretary of Agriculture to enter into contracts for research in utilization of agricultural products.

These contracts may be with public or private organizations or individuals, whenever it is determined that such research can be done to advantage outside of the Department of Agriculture.

FTC Renews Anti-Merger Law Plea

THE FTC IN ITS annual report, has renewed a long-standing recommendation that Congress amend the Clayton Anti-trust Act to "curb more effectively the increasing mergers of competing corporations."

A bill for this purpose (H.R. 4810) was favorably reported by the House Judiciary Committee in the last session, but failed to be considered.

No Caustic Soda Distribution Controls

CIVILIAN PRODUCTION ADMINISTRATION has abandoned any idea of a directive aimed at assuring delivery of caustic soda to consumers during this year, after reviewing proposals for voluntary handling of the situation by the industry.

Chief complainants over non-deliveries were a group of textile producers, and some others, in the Southeast, reported their usual supply sources were not taking orders for 1947. However, companies that had withdrawn from the soda industry reported they would continue to ship soda to all former customers who had no other source of supply. Other industry representatives reported they were shipping to 1946 customers in 1947, at least 64 percent of caustic soda shipped to these users last year.

Congress May Balk Negotiations

THERE WERE INCREASING signs in the new Congress that further tariff cuts would be strongly opposed in both Houses, and some members have suggested to the State Department the wisdom of postponing negotiations until conditions are more favorable.

Termination of Hostilities

THE YEAR-END ACTION of the President ending hostilities has certain technical implications for industry in general. Many of the matters involved in this action are still under study by interested Federal agencies, as well as private business, and a comprehensive analysis of the results has not been completed by these sources.

A Department of Justice summary of statutes affected by the Proclamation however, includes several governing plant seizure; the power in this respect conferred under the Selective Service Act was terminated, while powers under the War Labor Disputes Act, are terminated in six months. Other statutes affecting mining claims, tax deductions, and various contractural relations with the Government, also are involved.

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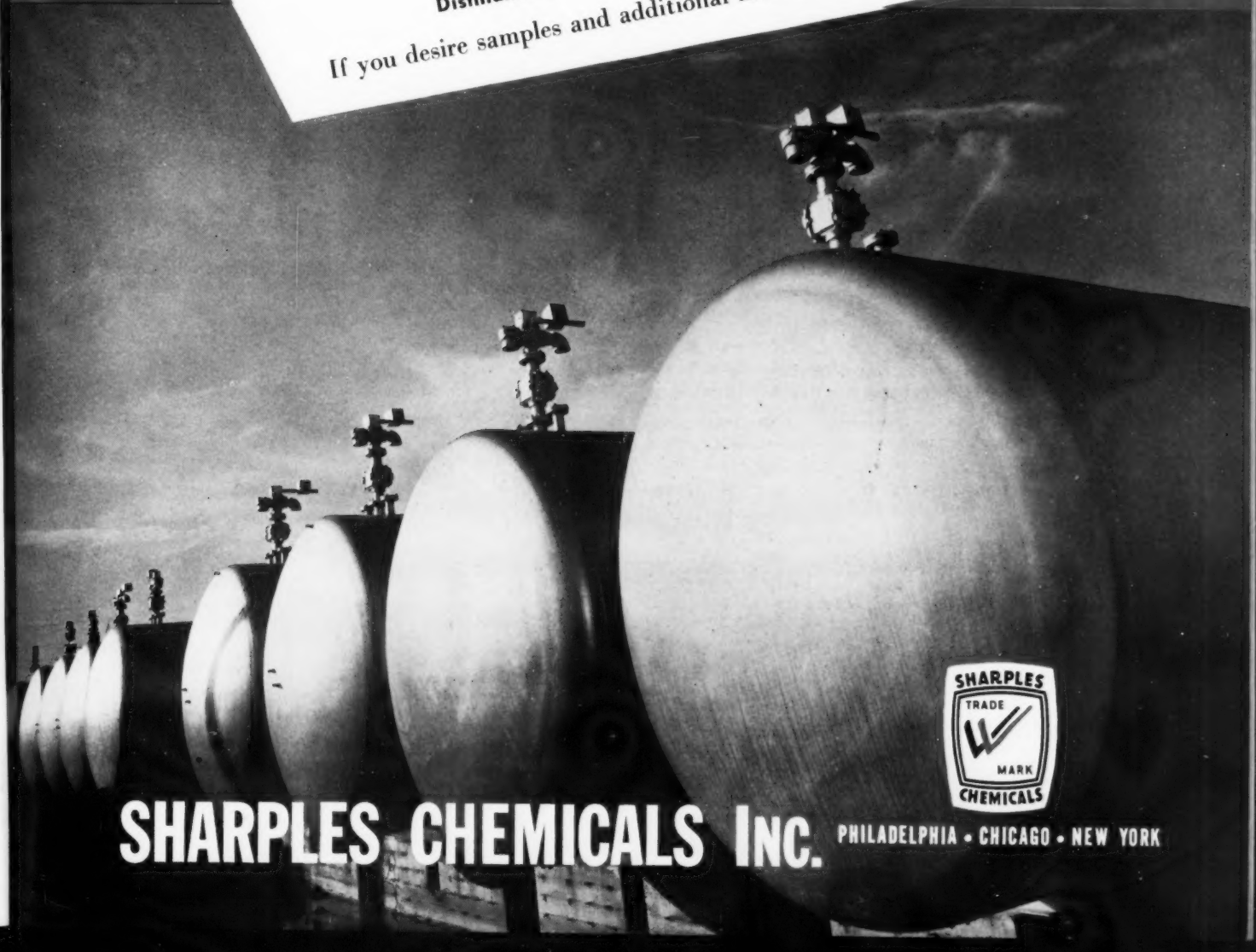

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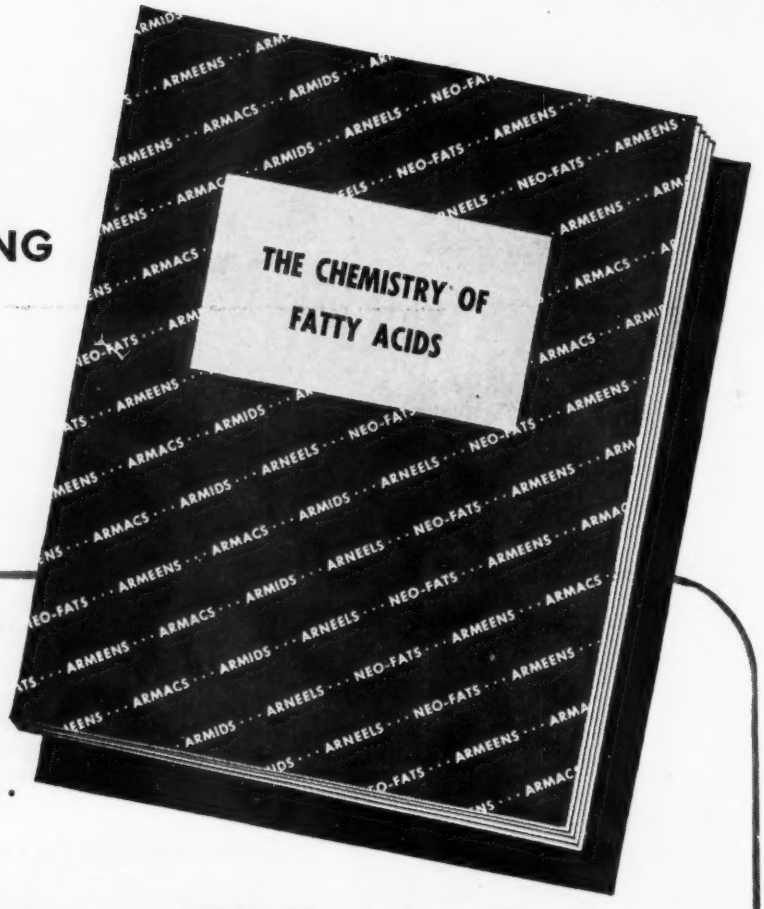

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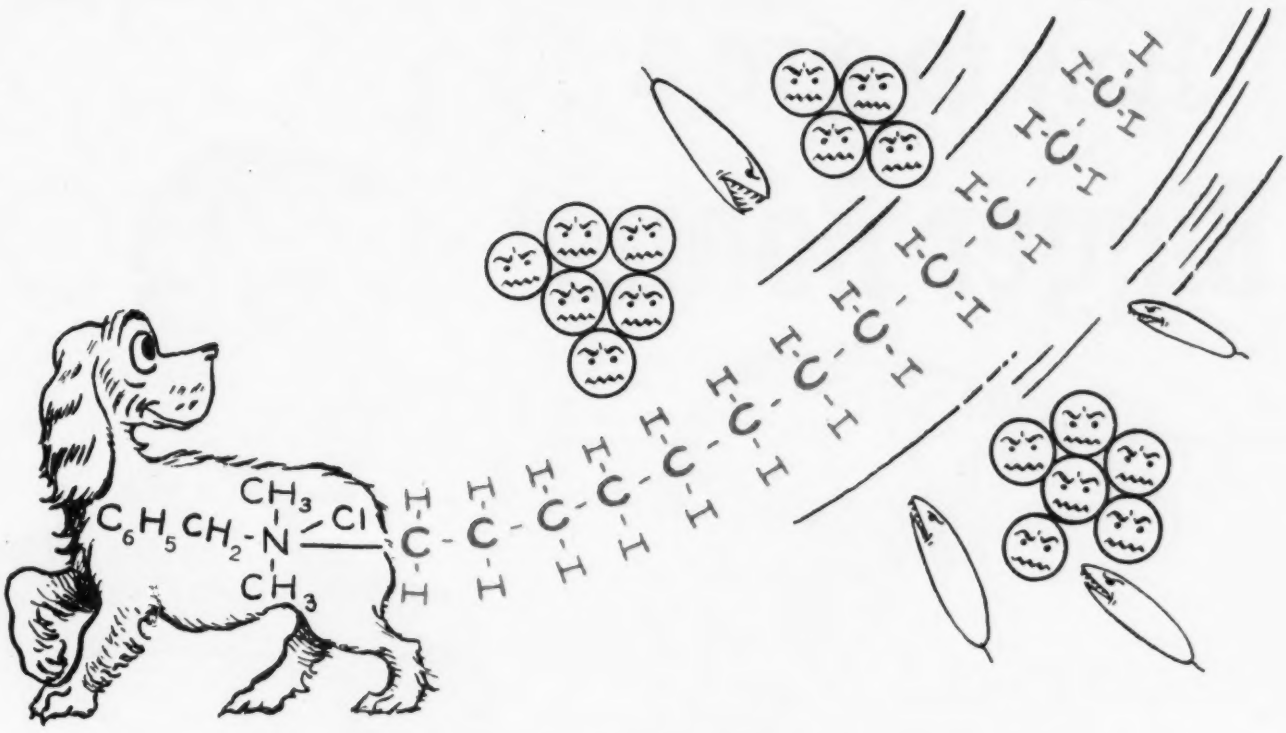

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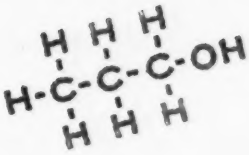

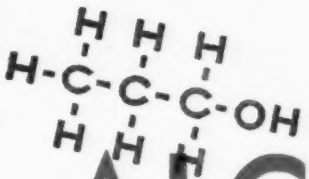

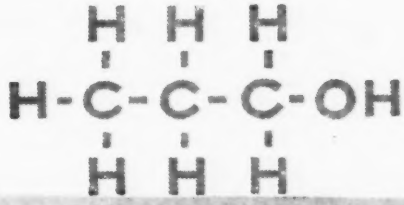

The Celanese chemical plant at Bishop, Texas, is now offering n-propyl alcohol in drum or tank car lots for early delivery. If you are looking for processing advantages in your manufacturing; for improvements in your products; or for shortcuts in your production, the advantages of this straight chain hydrocarbon are worth investigation.

PHYSICAL PROPERTIES

MOLECULAR WEIGHT		60.06
COLOR		water white
ODOR		characteristic alcohol-like odor
SPECIFIC GRAVITY	20°/4° C	0.804
DISTILLATION RANGE	ASTM	2° including true boiling point
WEIGHT PER GALLON	20° C	6.7 lbs.
SOLUBILITY		soluble in water, alcohol, ether and practically all other organic solvents
FLASH POINT	open cup	32.2° C
BOILING POINT	1 atm.	97.2° C
FREEZING POINT		−127° C
VAPOR PRESSURE	100° F or 37.8° C	0.9 lbs. per sq. in.

n-propyl alcohol possesses excellent solvent power and miscibility —can also be used as a replacement for other alcohols now in critical supply. Call or write for additional information.
Celanese Chemical Corporation, division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

PROPIONALDEHYDE

A Celanese Chemical with Possibilities for You

Here is a Celanese chemical with great industrial possibilities. Propionaldehyde—hitherto obtainable only in laboratory amounts—is now being produced by Celanese, and can be supplied in quantities large enough for pilot plant operation.

Furthermore, you can depend on Celanese for a steady supply of this aldehyde, when you are ready for full-scale production. Write for further information.

Celanese Chemicals

FORMALDEHYDE • ACETALDEHYDE • ACETIC ACID • METHANOL
ACETONE • ORGANIC PHOSPHATES • PLASTICIZERS • INTERMEDIATES

*Reg. U. S. Pat. Off.


SOLVING YOUR SHIPPING PROBLEMS IS OUR JOB
At General American we build all kinds of freight cars and operate the GATX fleet of more than 37,000 tank cars of 207 types. That's a lot of tank cars serving this country's industries.
Maybe you have a hard-to-handle shipping problem and maybe we can solve it for you.
Just call our nearest office.
GENERAL AMERICAN TRANSPORTATION
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135 South La Salle Street • Chicago
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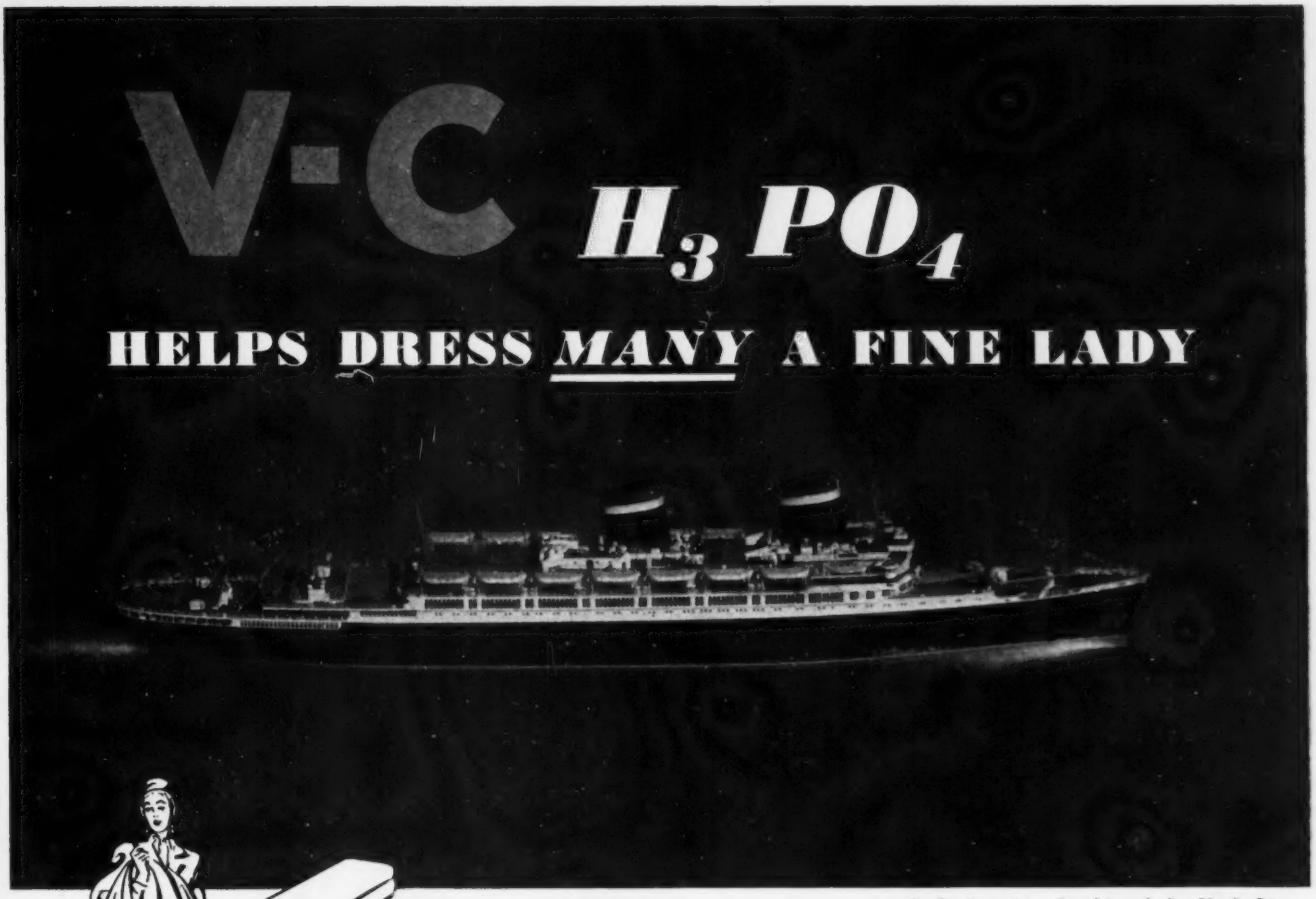
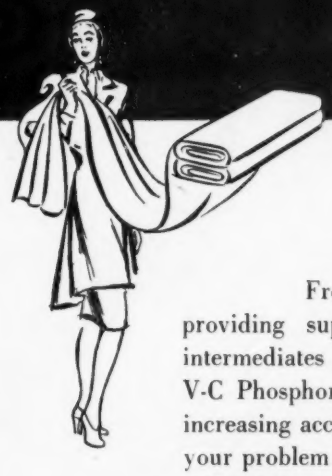
Pittsburgh • Cleveland • New Orleans • St. Louis • Tulsa
Dallas • Houston • Los Angeles • San Francisco • Seattle
GATX
GENERAL AMERICAN
TRANSPORTATION
CORPORATION
CHICAGO
GATX

V-C H_3PO_4

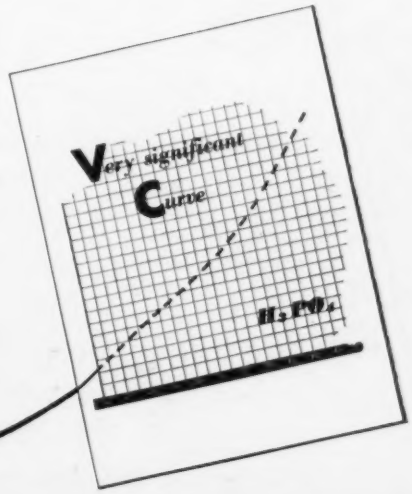
HELPS DRESS *MANY* A FINE LADY



S. S. America, flagship of the U. S. Lines, leaving Newport News Shipbuilding and Drydock Company's yard Nov. 9, 1946. V-C Phosphoric Acid was used in the treatment of her hull preparatory to her recent conversion there from wartime gray to peacetime "dress."



From treating the hulls of mighty ships to providing superior catalysts in the manufacture of intermediates for today's finer synthetic fabrics . . . V-C Phosphoric Acid plays an important part, gaining increasing acceptance with new users of H_3PO_4. Whether your problem is that of obtaining an easier pH control in a dye bath . . . or of phosphatizing for rust-prevention or improving paint adhesion . . . V-C high-purity Phosphoric Acid can serve you effectively, more economically. Virginia-Carolina Chemical Corporation looks forward to the opportunity of serving you.



V-C H_3PO_4 85% U. S. P. SYRUPY
V-C H_3PO_4 85% TECHNICAL
V-C H_3PO_4 75% FOOD GRADE

VIRGINIA-CAROLINA CHEMICAL CORPORATION

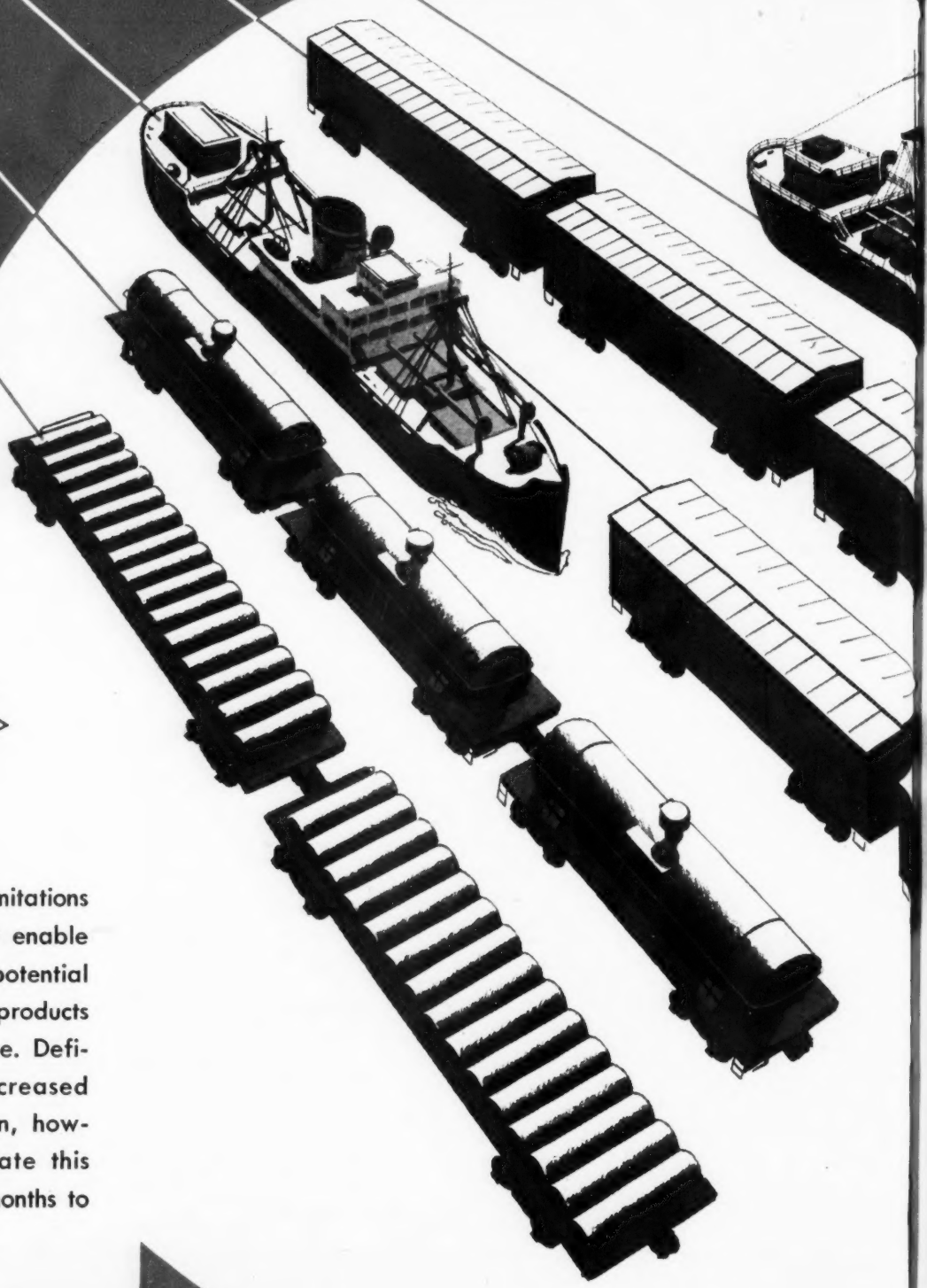
RICHMOND 5 VC CHEMICALS VIRGINIA

HAND IN HAND WITH INDUSTRY

Serving satisfied customers everywhere!

DIAMOND ALKALIES

Soda Ash — Caustic Soda — Bicarbonate of Soda — Liquid Chlorine
Carbon Tetrachloride — Detergents



ALKALI

We regret the limitations of supply do not enable us to supply all potential users of Diamond products at the present time. Definite plans for increased future production, however, will alleviate this situation in the months to come.

DIAMOND ALKALI COMPANY... *Pittsburgh 22, Pa., and Everywhere*

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U.S.I. CHEMICAL NEWS

February ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1947

Sulfanilamide Activated By Urea and Urethan

Sulfanilamide in quantities insufficient to inhibit growth of bacteria becomes bacteriostatic when mixed with urethan or urea, according to a paper published recently. In addition, the author states, urethan increases the solubility of sulfanilamide at least two times and of sulfathiazole at least three times. The report also indicates that urethan improves the action of penicillin, particularly in the treatment of mixed infection of wounds.

Increases Soap Lather

To improve the lathering of soap, a method has been devised which consists of treating the soap with nitric oxide prior to the salting out process. The soap afterward was said to give a thicker and finer lather than without this treatment.

THE MONTH IN TEXTILES

A flameproof, mothproof, and non-shrinking wool is said to have been developed . . . Limited commercial production of nylon staple fiber — a material claimed to have outstanding properties of strength, abrasion resistance, and dimensional stability — is announced . . . A method for lubricating fibers at a stage prior to spinning is patented . . . Congress will be asked to enact a law forbidding interstate transport of highly flammable textiles, according to a reputable source . . . A waterproof and stainless fabric is marketed which is said to need no special stitching . . . A report on synthetic fiber developments in Germany is made available . . . The British announce a new organization to undertake research into the growing and breeding of cotton . . . A device is produced which accurately determines the amount of moisture in wool . . . A new finishing agent for cotton and rayon fabric, described as a water-soluble gum finish of low viscosity and good stability, is manufactured . . . A new dry-cleaning fluid is placed on the market.

New NF VIII Available

The new, completely revised and enlarged National Formulary has just been issued. It is said to represent the culmination of four years of planning and work by the Committee on National Formulary, the staff of the American Pharmaceutical Association Laboratory and hundreds of collaborators.

Ups Starch Solubility

The solubility of starch in aqueous solutions is said to be increased by a process patented recently. The process consists primarily in treating the starch with a soluble inorganic chlorite under prescribed conditions of heat and pressure.

New Shampoo Stabilizer

The turbidity tendency of shampoo compositions can be decreased notably by the use of a stabilizing agent, described as an anion-active salt of a monoalkyl sulfate, according to a recent patent. Lathering power is said to be unimpaired by the stabilizer.

1946 Advances in Drug Field Used Many U.S.I. Chemicals

Intermediates, Solvents, and Other Chemicals Supplied for Amino Acid Therapy, and Treatment of Leukemia, Malaria and Ophthalmia

The cascade of "wonder-drugs," fed by seven years of intensive war-time research, swelled last year as new pharmaceuticals hit the market and as "top-secret" labels were removed from many war-time developments. During the year, U.S.I. continued to supply the pharmaceutical industry with many chemicals, intermediates, and solvents. Among its major contributions was a new low-cost method for synthesizing the up-to-then rare and expensively-priced methionine, a vital amino acid for which wide use is foreseen in human foods, animal feeds, and the treatment of various diseases.

Also introduced last year were new therapies for periodic ophthalmia and leukemia, the dreaded "cancer of the blood," in which riboflavin and urethan respectively played prominent parts. Government scientists disclosed the development of a new synthetic drug, "SN 7618," which is said to be superior to both atebrin and quinine in the treatment of malaria. Familiar pharmaceutical stand-bys, such as ethyl acetate, ethanol, acetone, and butanol, gained new stature by their applications in the manufacture and processing of vitamins, hormones, barbiturates, "sulfa" and other drugs.

Low-Cost Methionine

Practically unobtainable before 1946, methionine is now available to pharmaceutical manufacturers for much-needed applications, thanks to the new U.S.I. manufacturing process which slashes costs about 97 per cent. Anticipated uses for this compound, which is one of the ten amino acids necessary for the growth and repair of animal tissue, include the treatment of shock, burns, exposure, as well as poisoning from a wide range of compounds. It is reported that protein hydro-

(*Continued on next page*)

New Scale Simplifies Solution Preparations

To simplify the preparation of solutions in which the weight of water must be figured, a new scale has been developed which is claimed to save considerable time for pharmacists and chemists because unit weights replace tedious mathematical calculations. The new scale is graduated into units, called "yagles." Each "yagle" is equal to one per cent of the weight of a fluid dram of water (454.6 grams).

Hormone Combats Ulcers

A group of American scientists have announced the isolation of a new hormone which is claimed to have brought relief to 40 of 58 patients suffering from peptic ulcers. The hormone, known as enterogastrone, is said to be derived from the mucous lining of the upper intestinal tract of pigs.

Mildew Resistance Tests

A summary of the tests used to determine the mildew and rot resistance of textiles and the effectiveness of textile fungicides have recently been published. Complete laboratory details of the more important tests are given.

In 1846, William Morton made the first public demonstration of the use of ether as an anesthetic. Since then, the pharmaceutical industry has continued to triumph over pain. Last year saw the introduction of new therapies for leukemia, malaria, and ophthalmia.

Pharmaceutical Advances in 1946

(Continued from page one)

lysates fortified with methionine have been employed with outstanding success in the treatment of peptic ulcers and starvation cases.

Hope for Leukemia Victims

To the many victims of leukemia, for which no cure has yet been found, new hope came last year as British scientists announced a definite palliative effect in many cases when urethan treatments were used. The results were reported to be similar to those obtained from X-ray therapy which has been employed for some time to give temporary relief and to prolong life in chronic forms of the disease. Urethan therapy, it was noted, dropped the total white blood count to normal limits and raised the hemoglobin level.

New Antimalarial

After four years of extensive research the U. S. Government's Board for the Coordination of Malarial Studies finally came up with a new antimalarial, "SN 7618," which, it is claimed, relieves malaria three times faster than atebrin or quinine, and with fewer ill effects. An important intermediate in the manufacture of this drug, is noval ketone (5-diethylamino-2-pentanone), a product of U.S.I.

Wider Use for Old Stand-bys

Familiar chemicals continued to play important roles in the pharmaceutical industry in 1946. A stir was created when it was announced that ethanol was found effective in the treatment of rats' cancer, but the greatest pharmaceutical manufacturing use for this compound was still found in the processing of vitamins, hormones, and plant extracts. Other solvents, such as amyl alcohol, amyl acetate, butanol, and acetone entered into the same type of processing. Riboflavin extracts were suggested as a cure for periodic ophthalmia, "moon blindness," a disease common to horses. Diethyl carbonate and diethyl oxalate were used in the preparation of barbiturates; ethyl acetoacetate in the manufacture of antimalarials, leucine, antipyrine, and Vitamin B_1; and ethyl acetate in the processing of "sulfa" drugs, such as sulfadiazine.

25,000 ATTEND FIRST AUTOMOTIVE INDUSTRIES SHOW SINCE PEARL HARBOR

More than 450 exhibitors displayed products ranging from seat covers to hydraulic springs at the Automotive Service Industries show held recently at Atlantic City under the joint sponsorship of the MEMA and the MEWA. The show attracted about 25,000 visitors. Shown here at the U.S.I. booth, left to right are: J. F. Creamer, Horton, Gallo, Creamer Co., W. J. Fried, U.S.I., J. T. Fleming, Horton, Gallo, Creamer Co., W. W. Newell, U.S.I., A. E. Tongue, U.S.I., H. L. Snyder, Jr., U.S.I., T. M. Bennett, U.S.I., J. Blessing, Harrisburg Auto Parts Co., and E. B. Mower, George W. Myers Co.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A modified carnauba wax, having an alleged melting point of 178-180 degrees F, is recommended by the manufacturer for use in self-polishing floor waxes, and in the production of carbon paper and carbon inks. **(No. 159)**

USI

An easy method for testing tension in a strand of thread, yarn, or cord is said to be supplied by a new tensometer which measures tension directly in pounds. Clipped on a moving continuous cord, the instrument is reported to record fluctuations with a minimum of error. **(No. 160)**

USI

Quantitative test papers for determining concentrations of quaternary ammonium compounds are now on the market. Strength in parts per million is rapidly measured merely by dipping the papers in the solution, according to the manufacturer. **(No. 161)**

USI

A "fool-proof" liquid adhesive, stated to require no catalyst or special preparation for use, is described as a tough, flexible cement having a six-months' minimum package stability. The manufacturer states that the adhesive can be applied without thinning by brushing, roller coating, or dipping. **(No. 162)**

USI

An odorless lanolin, said to be applicable to the manufacture of cosmetics, is reported to have a new non-darkening pale color. **(No. 163)**

USI

A lighter-than-cork insulating material is described as a cellular rubber that will not absorb moisture and is fire-resistant, rot-resistant, and unaffected by acids, oil, vermin, and termites. Said to be a more efficient insulator than cork, it is specially recommended for refrigerator trucks. **(No. 164)**

USI

Four types of phenolic cements, designed primarily for acid-proof brick or tile in the construction of acid tanks, pulp digesters, acid towers, and floors, have been developed. Supplied as powders, the cements are reported to set in 4 to 6 hours at room temperature and to retain their physical properties over a wide temperature range. **(No. 165)**

USI

A new rubber accelerator, which is alleged to make tires more resistant to thread cracking and ply separation, has been announced. It is said to be especially beneficial in the processing of synthetic rubber. **(No. 166)**

USI

A new fungicide and spray adjuvant that will not wash off in rain or dew, according to the manufacturer, is described as an air-drying adhesive which can be used as a carrier for insecticides and other fungicides. The compound is mixed with water and can be used in all standard equipment, it is stated. **(No. 167)**

Chemicals

FOR THE PROCESS INDUSTRIES

THERE'S no substitute for the word experience. It's well to bear in mind that Turner has been supplying chemicals to the process industries for over 75 years. Call on us the next time you're in the market and you'll be quick to say that Turner is *"long on quality and strong on service."*

TURNER CHEMICALS

- Ammonium Sulphate (Refined)
- Ammonium Persulphate
- Borax
- Caustic Soda (Flake and Solid)
- Caustic Potash
- Sodium Chloride
- Carbonate of Potash
- Potassium Persulphate
- Copper Carbonate
- Bromides (Sodium — Potassium — Ammonium)
- Phosphorus Oxychloride
- Phosphorus Trichloride
- Stearates (Aluminum—Calcium —Zinc)

JOSEPH TURNER & CO

83 Exchange Place, Providence, R. I. RIDGEFIELD, NEW JERSEY 435 N. Michigan Ave., Chicago 11, Ill.

FOR YOUR INFORMATION

NO PRICE INCREASE

Present Price
$1.40

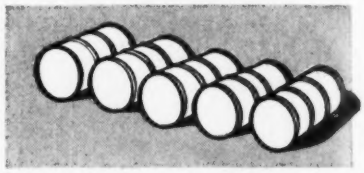
Prewar Price
$1.45
(in 100-pound lots)

SACCHARIN. Although production costs have advanced considerably during the war period, no increase in the price of Saccharin has been scheduled. In fact, Monsanto's present pound price, in 100-pound lots, is lower than its prewar price—$1.40 compared to $1.45. Price of single 5-pound cans remains $1.65 a pound, unchanged since before the war.

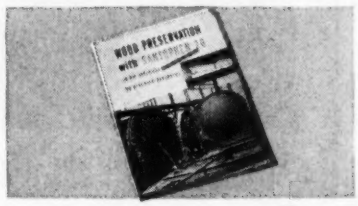
While capacity was materially increased during the preceding 5 years, unsettled labor conditions curtailed production during the past 6 months. However, with production now resumed, it is expected that Monsanto will be able to meet all normal requirements on a current basis in the early part of 1947. Also, it is anticipated that appreciable gains will be made on the present backlog of demand.

MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

ROLL CALL!



Although the war is over, the shortage of drums isn't—due of course to a basic shortage of steel. In many cases this poses an acute packaging and shipping problem at Monsanto which can be considerably relieved by the return of empties as soon as they are available. So, if you have any empties may we ask that you send them back to Monsanto for credit. This will greatly expedite future deliveries—we may have the products you need, but not the containers in which to ship them.

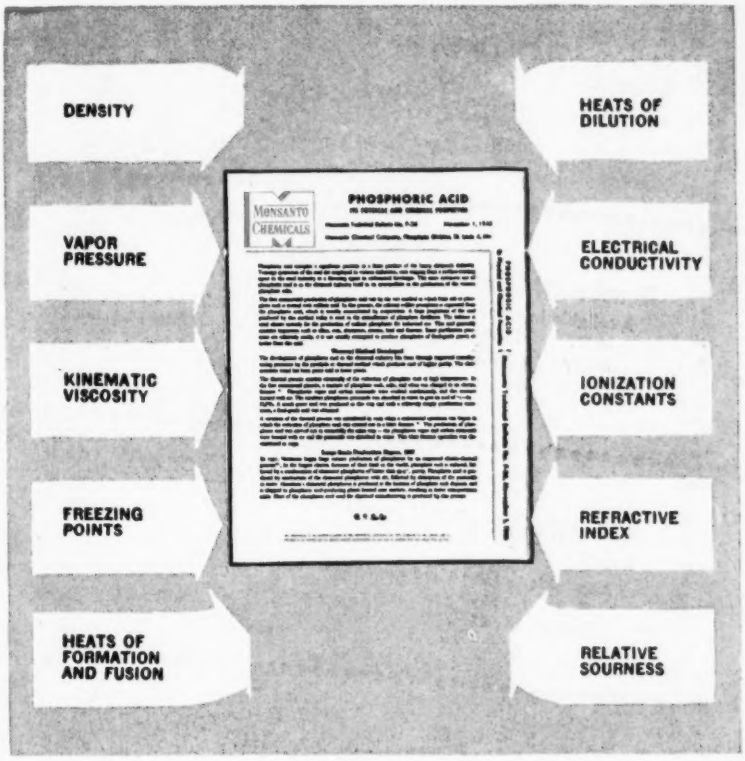


New Literature on Wood Preservation with Santophen 20*
(Monsanto's Pentachlorophenol, Technical)

Recently published, this 16-page booklet forms a valuable text on wood preservation with Santophen 20* in oil solutions by pressure process. It is liberally illustrated and contains numerous tables and reference data concerning the characteristics of this recognized wood preservative. Send for your copy.

Expanded Production of Synthetic Detergents

Monsanto recently announced a $3,000,000 plant expansion program for the manufacture of synthetic detergents. Construction is already under way and it is anticipated that the new plant will be ready for operation in the latter part of 1947.



In 12 Handy Tables — All Available Physical Data on PHOSPHORIC ACID

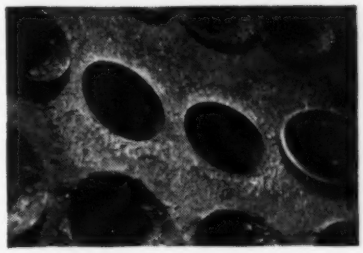
Through many years of research Monsanto's Phosphate Division has attempted to catalog and correlate all available physical and chemical data on phosphoric acid—and here the results have been distilled into twelve handy reference tables and four pages of explanatory notes.

From the tabulations in this fact-packed bulletin, graphs of the desired size and range can be prepared. Data are included on acids of a wide range of strength up to the strong phosphoric acids wherever available.

Write on your business letterhead for your copy of this helpful Technical Bulletin No. P-26 on Phosphoric Acid—a product recognized as one of the most versatile and widely useful tools of the chemical industry.

Address MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri

District Offices: New York, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle. In Canada, Monsanto Ltd., Montreal, Toronto, Vancouver.



Does this mean anything to you?

No, this isn't another picture of the moon! The "rugged terrain" you see is simply a head-on view of oxygen corrosion—foe of the boiler room, thief of power- and steam-generating efficiency. Fortunately this form of corrosion can be checked, simply by adding Santosite* (Monsanto Sodium Sulfite Anhydrous) to boiler feed water and maintaining a ratio of 30 parts to 1,000,000. All residual dissolved oxygen in feed water combines with Santosite to form sodium sulfate, the reaction product with oxygen. Result: no trace of oxygen remains—oxygen corrosion can't start!

Goodbye, Mr. Rat!

After hundreds of years as a world scourge, the rat is nearing the end of his trail of terror and filth. With the coming of Compound 1080, his doom is nearer at hand, as well as that of his army of 1,300 rodent relatives—house mice, field mice, squirrels, gophers and woodchucks, just to mention a few. Outside experiments are also being conducted to test the effectiveness of Compound 1080 in exterminating wolves, foxes, coyotes and other predatory animals. (Because of its high toxicity, Compound 1080 is sold only to licensed operators and to Government Experimental Stations.)

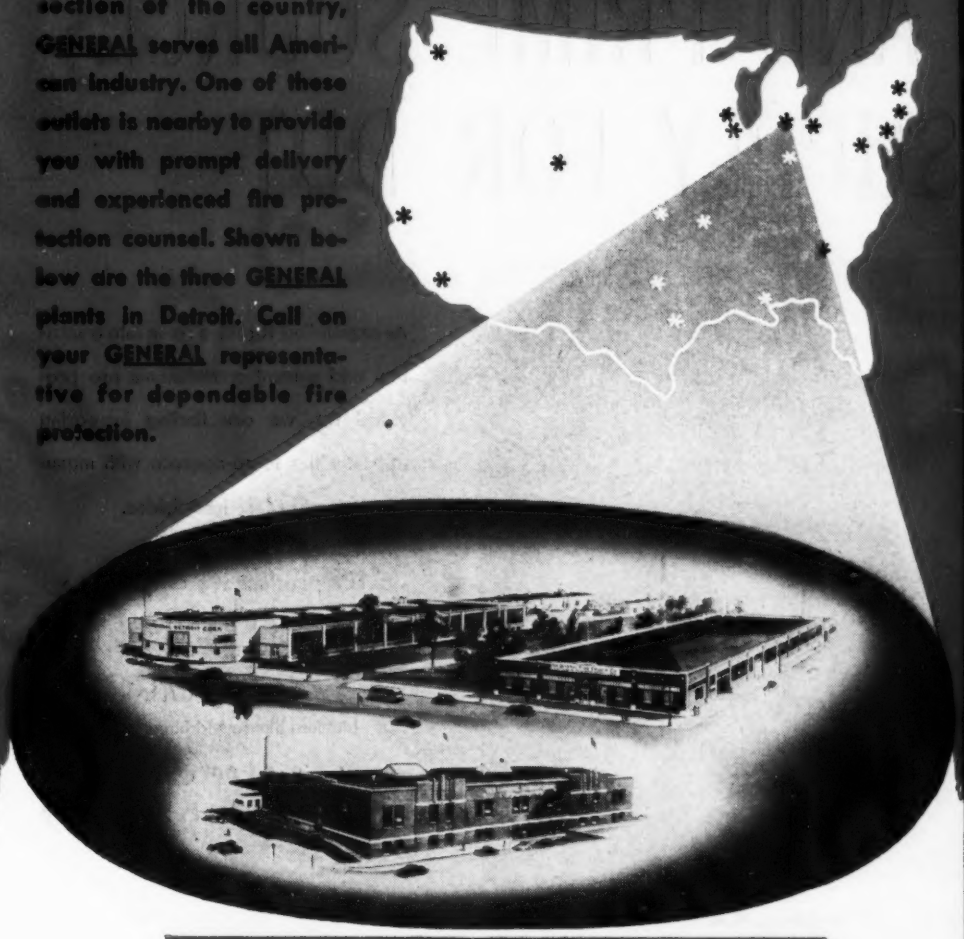
MONSANTO
CHEMICALS AND PLASTICS
SERVING INDUSTRY... WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, 1700 South Second St., St. Louis 4, Missouri...District Offices: New York, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle. In Canada, Monsanto Ltd., Montreal, Toronto, Vancouver. *Reg. U.S. Pat. Off.

NATIONAL SERVICE

20 GENERAL Branches and Warehouses To Serve You...

Through its branch offices and distributors in every section of the country, GENERAL serves all American industry. One of these outlets is nearby to provide you with prompt delivery and experienced fire protection counsel. Shown below are the three GENERAL plants in Detroit. Call on your GENERAL representative for dependable fire protection.



S-O-S Fire Guard

S. O. S. FIRE GUARD Vaporizing Liquid Extinguisher—America's great utility fire fighter. Effective on oil, electrical, grease, and gasoline fires. Will not freeze at 48° below zero. 1 qt. and 1½ qt. sizes.

CD SnoFog

CD-SNO FOG Carbon Dioxide Extinguisher. Kills fire instantly, yet cannot damage equipment, premises, or personnel. Effective on electrical, oil, and gasoline fires. Sizes 2 to 100 lbs.

Red Star

RED STAR Soda Acid Extinguisher. Releases strong stream of water under chemical pressure. Immediately effective on wood, paper, or textile fires.

IF IT'S GENERAL IT'S DEPENDABLE

THE GENERAL DETROIT CORP.

Manufacturers of Fire Extinguishers
Motor Fire Apparatus and Allied Equipment
2270 E. JEFFERSON • DETROIT 7, MICHIGAN
NEW YORK • PHILADELPHIA • ATLANTA • CHICAGO • DALLAS
West Coast Affiliate: The General Pacific Corp.
Los Angeles San Francisco Seattle
Distributors in Principal Cities

Floafome

FLOAFOME Foam Type Extinguisher. Smothers fire under a blanket of foam. 2½ gallon size produces 22 gallons of foam. For use on wood, paper, textile, oil, and gasoline fires.

Protector

ALASKAN and PROTECTOR Pump Type Extinguishers. For wood, paper, or textile fires. Range is 45 feet. Non-freeze charge protects at 48° below zero. ALASKAN—2½ gallons; PROTECTOR—5 gallons.

Pacemaker

PACEMAKER Knapsack Type Extinguisher. Can be strapped on back and operated from that position. Telescopic pump nozzle leaves both hands free for fighting fire. Ideal for outdoor fires.

MERCK IS SERVING THE INSECTICIDE INDUSTRY AS A BASIC AND PRIME SOURCE OF SUPPLY FOR DDT

An aerial view of the Main Plant of Merck & Co., Inc. at Rahway, N. J.

As expanding facilities come into operation and current commitments are provided for, we are finding increasing opportunities to co-operate with manufacturers of DDT insecticides.

The product we offer is —

DDT

TECHNICAL

(dichloro-diphenyl-trichloroethane)

Setting Point 89° C. Minimum
For Manufacturing Purposes Only

Write us for prices and let us know your requirements. Please address your inquiry to the Insecticide Products Department, Merck & Co., Inc., Rahway, N. J.

DDT TECHNICAL

For the Manufacture of Agricultural, Livestock, Horticultural, and Household Insecticides

MERCK & CO., Inc. RAHWAY, N. J.

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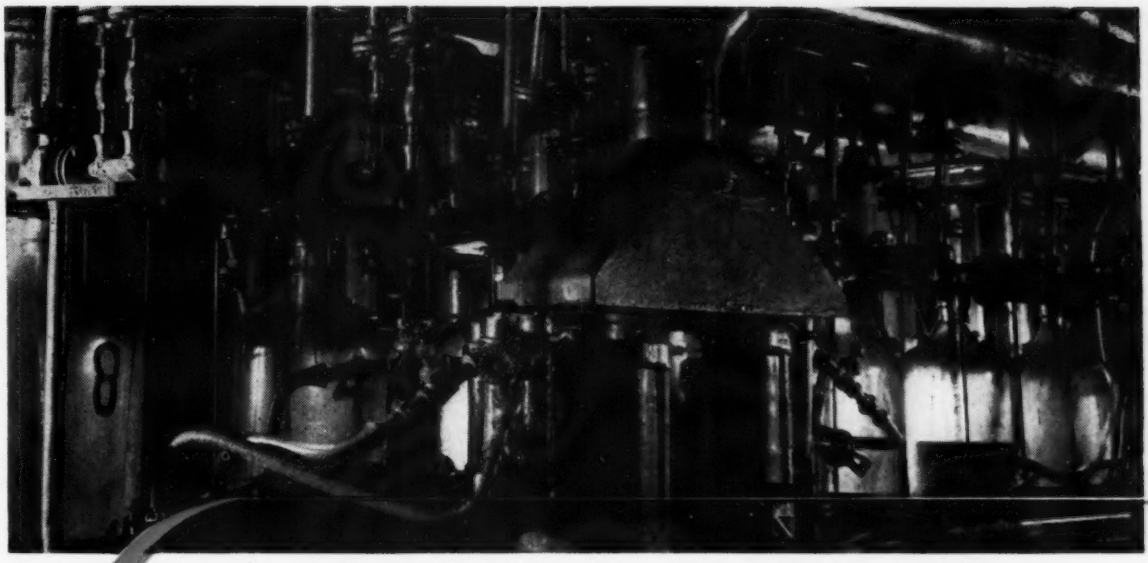

Samples of benzyl chloride are drawn off during distillation, for inspection and test, to assure conformity with Hooker high purity specifications.

For Compounds Containing $C_6H_5CH_2$— Use Hooker Benzyl Chloride

The list of chemicals that can be made with Benzyl Chloride includes almost every compound that contains the $C_6H_5CH_2$—group.

Benzyl Chloride is so reactive that it will give up its benzyl group in many different types of reactions. Friedel Crafts reactions are readily carried out, a typical one being the preparation of diphenyl methane by reacting benzyl chloride and benzene in the presence of aluminum chloride.

It may be reacted with alcohols to produce mixed ethers.

An example of the introduction of the benzyl group into an amino compound is its reaction with aniline to form benzyl aniline.

The benzyl group replaces sodium in reactions of benzyl chloride with sodium cyanide or sodium sulfhydrate.

Esters are readily prepared by reacting the sodium salt of the acid with benzyl chloride.

For uniform results without operating difficulties be sure to use Hooker Benzyl Chloride. Hooker maintains careful control of manufacture and strict adherence to high standard specifications to make sure that all shipments are up to the same uniform high purity.

TYPICAL DATA

BENZYL CHLORIDE
(omega chlortoluene) $C_6H_5CH_2Cl$

DESCRIPTION:
Clear, colorless to light yellow liquid having a pungent odor. Infinitely miscible with alcohol and ether; immiscible with water.

PHYSICAL DATA:

Ml. Wt.	126.5
F. P.	—43°C
B. R.	5° or less incl. 179.4°C

USES:
In manufacture of chemical intermediates, dyestuffs, perfume bases, plasticizers, resins, wetting agents, rubber accelerators, gasoline, gum inhibitors, pharmaceuticals.

For further information on Hooker Benzyl Chloride and other Hooker intermediates ask for Bulletin 320 on your company letterhead.

From the salt of the earth

HOOKER ELECTROCHEMICAL COMPANY

3 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
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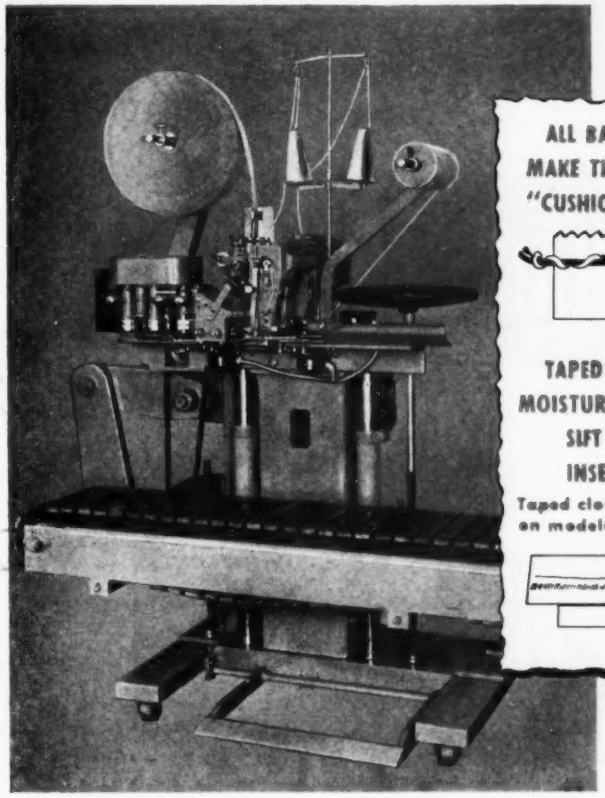

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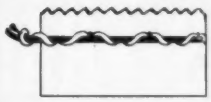

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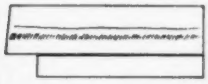

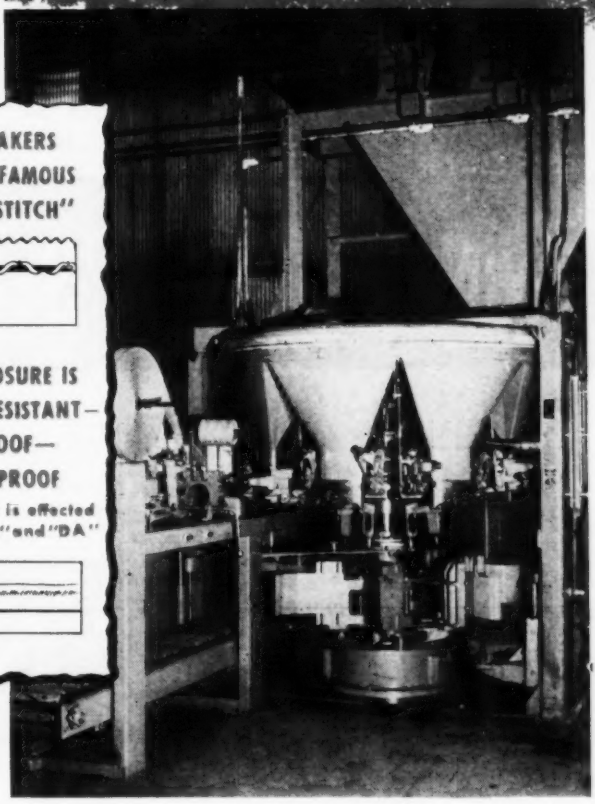

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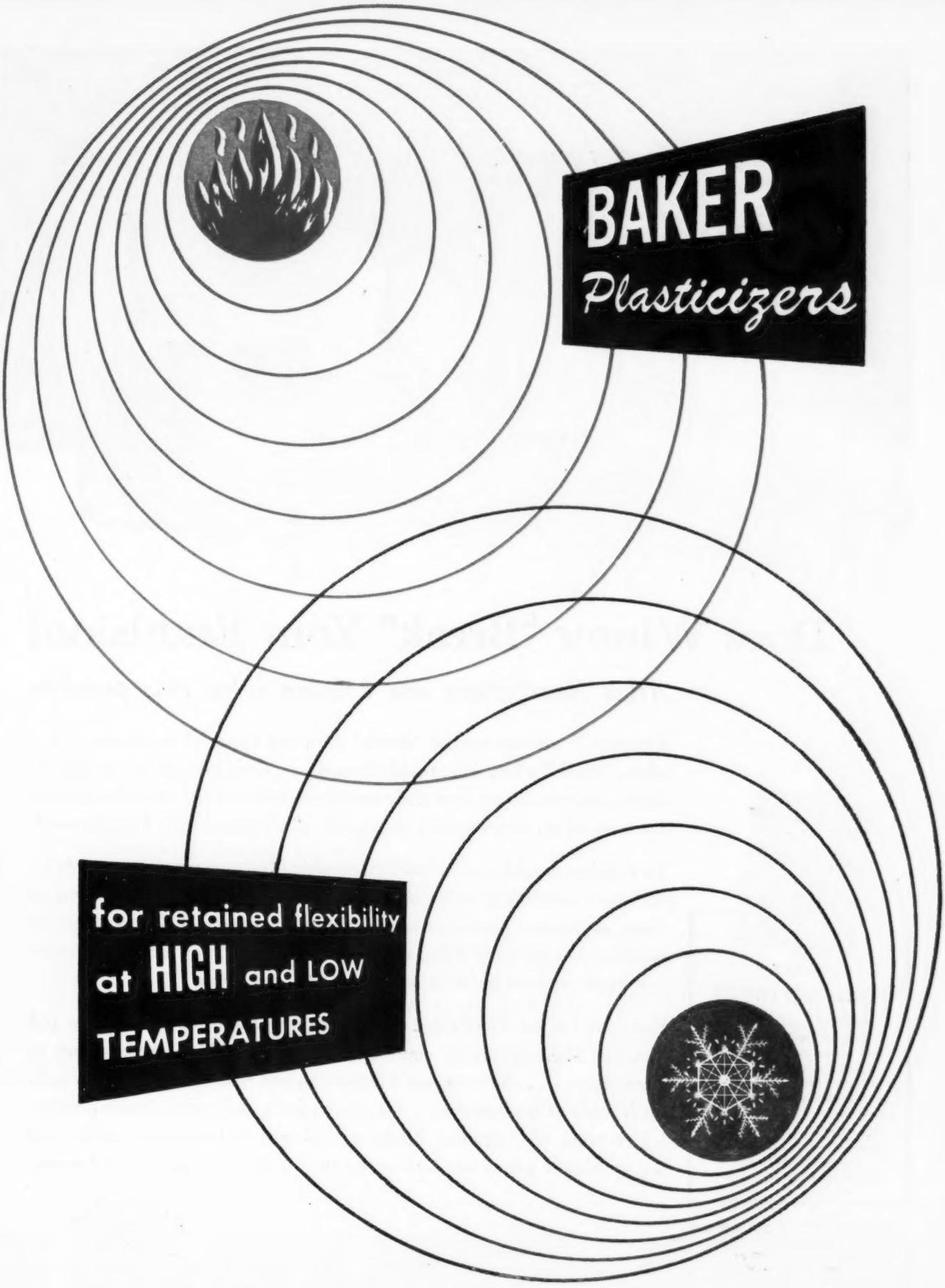

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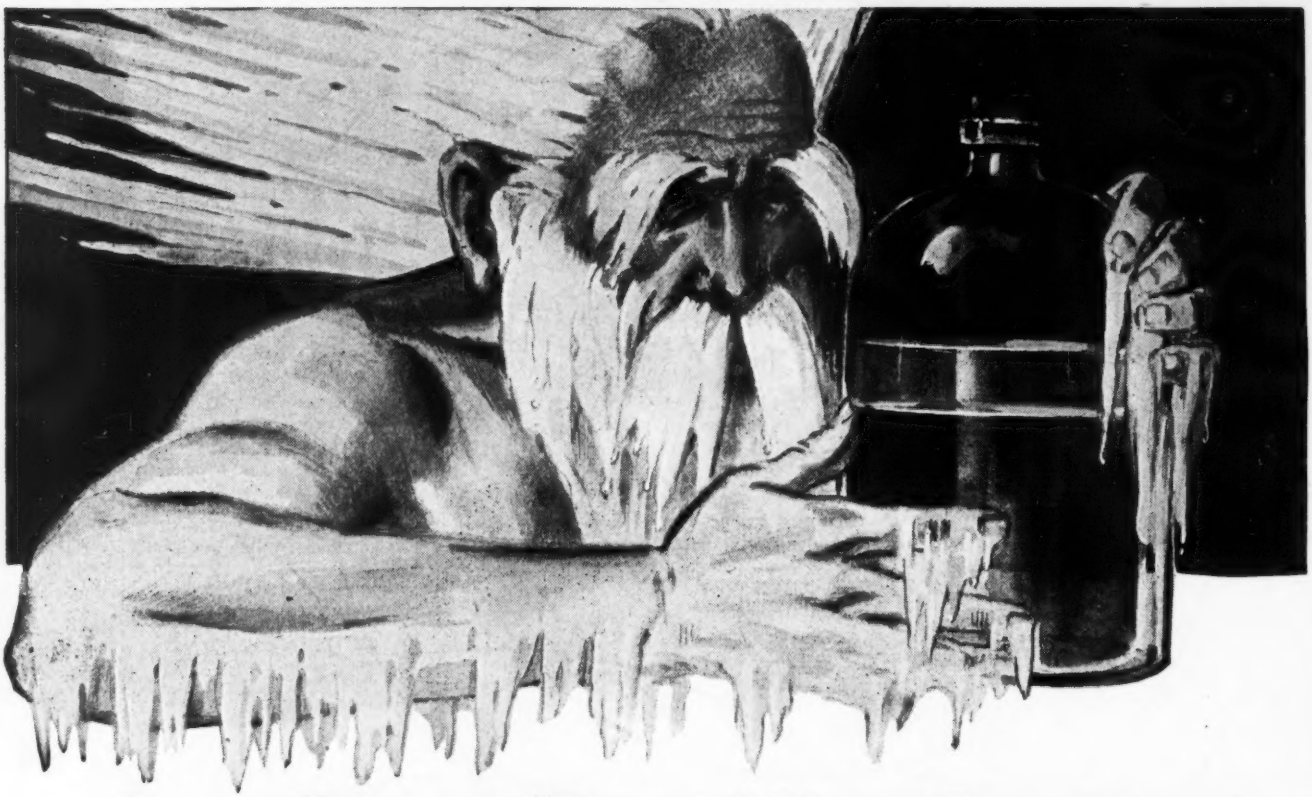

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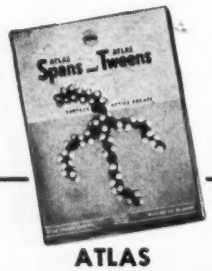
But winter safety is only one of the advantages of using Atlas Spans and Tweens. These non-ionic emulsifiers are also stable in the presence of electrolytes . . . the emulsion builder can use either hard water or soft. Such fields as food products, pharmaceuticals, cosmetics, textile processing, cutting oils, cleaning fluids, agricultural and sanitary sprays and water-thinned paints are finding the answer in Atlas Spans and Tweens.



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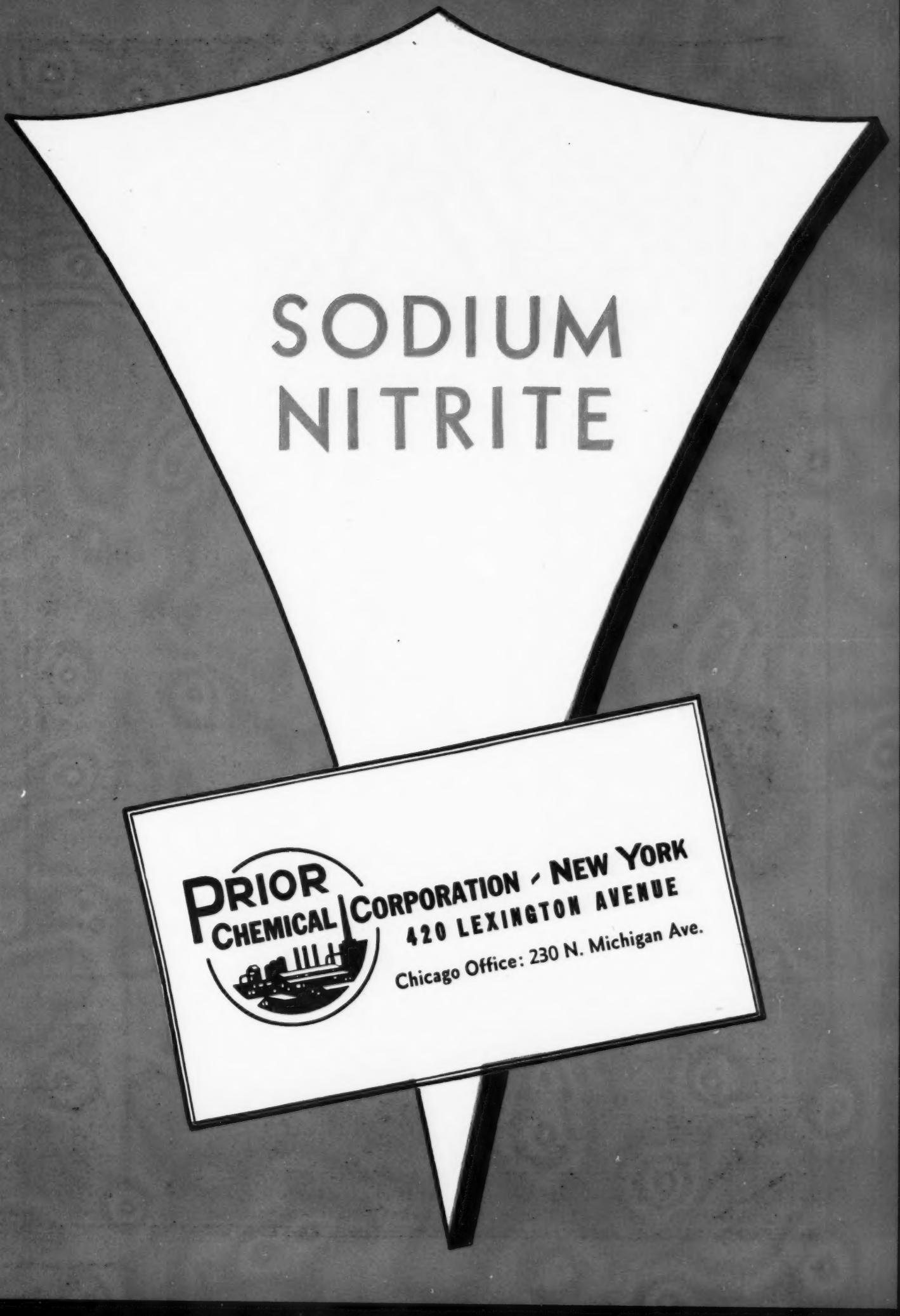
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The Case for the Tariff

by ROBERT L. TAYLOR, editor

OUT OF ALL THE SMOKE AND FIRE of the reciprocity committee hearings in Washington last month there emerged one very compelling reason why United States tariffs on chemicals should not be reduced at this time:

Chemicals now occupy no less a position than that of guns, airplanes and other direct armaments as keepers of the national security. We can no more afford to chance dependence on foreign nations for our chemicals than we can for our steel or battleships.

The last war removes any trace of doubt about the essentiality of a strong, well-integrated chemical industry to a nation's defense plan. Germany realized this in preparing for two wars. Japan spent huge sums on chemical plant construction in the years before Pearl Harbor.

If there is another war the one thing we can be sure of is that it will be swift and devastating. We must be prepared at once both to combat and to use such weapons as biological agents, atomic explosives and guided missiles. We shall have no time to mobilize or build plants. In the case of chemicals, it will be impossible to stockpile the tremendous quantities that will be needed. We can only hope through encouragement of a strong domestic industry to have the facilities and know-how that will be needed for instant conversion to war needs.

Other major nations recognize this situation and already have protectionist measures that are more stringent than our own. England and France, for example, go considerably further than mere tariff protection. France specifically prohibits imports of a long list of chemical products, including many organic dyes and intermediates, without official government authorization. England, through the use of import permits, regulates strictly the importation of any chemical or chemical product for which a satisfactory substitute is made in her own country.

Russia has greatly expanded her state-controlled chemical industry and has further sizable additions in view. Aside from her own imports and exports, she may be expected to exercise effective control over those of her satellite countries in Eastern Europe.

But the mere plant facilities are not the only reason why a strong, going chemical industry is essential to our national security. Equally vital is the reservoir of trained technical personnel that such an industry provides. How else could we keep a standby staff of scientists and engineers capable of stepping in at any time and operating emergency war plants?

Other nations are stockpiling chemical facilities and chemical brains. We cannot permit our stockpile to be depleted through lack of adequate tariff protection. We cannot let ourselves degenerate into a chemical "have not" nation.

Until peace in the world can be assured, basic American industries should be ready for peak production on short notice. Failure on the part of our Government to encourage and promote this readiness is a dangerous and inexcusable shortcoming.

Now Is the Time To Reformulate

IF YOU ARE MAKING SPECIALTIES, have you reviewed your formulations recently? If you haven't, the project is well worth considering in view of the changes in compoundings that raw material shortages have necessitated.

This month we visited three specialty factories. One was devoted to the manufacture of polishes, another to the production of carbon papers, and the third was a printing ink establishment. One fact impressed us. The plants were modern, well-staffed, and well-equipped. But all three were using Topsy-like formulations. They had "just growed."

To be specific, one wax polish had 23 constituents. Yet only eight were required for the manufacture of a satisfactory product. The other 15 had just "crept in" as an outgrowth of wartime raw material shortages. Substitutes had to be used, but no attempt had been made to reformulate *completely*.

When another wax was incorporated to replace carnauba it did not yield the desired gloss. A special emulsifier was added. Then it was too tacky, so a resinous hardening agent was blended in. And so it went with each substitution. No attention was paid to the other ingredients. Each case was treated as an individual, unrelated project. The net result: five

chemicals all having the same fundamental properties were used in the polish. Several other ingredients had opposing functions—they cancelled one another out quite effectively.

Of course there is a simple solution—one which can mean more profitable operation and a more acceptable product. Consider all formulation changes as part of the whole. Formulate on a 100 per cent basis. You will eliminate many headaches, improve product uniformity, and save some money.—WAJ.

A Tip to the States

WE ARE STRUCK by three statements in an announcement by the California State Personnel Board of an examination for the position of Chief, Division of Mines.

First of all, the position is one for which relatively few men are qualified. A college degree in mining engineering or geology and ten years of broad professional experience are required.

Second, applicants do not have to be residents of California.

Last and most important, the examinations are given simultaneously at various locations *in California.*

It would appear to us that the states—of which California is only one example—do themselves an injustice by confining examination sites within their own borders. Perhaps the right man for the job lives in New Jersey, and perhaps (if he can find a place to live) he would like the job in California. We doubt, though, that he would gamble three or four hundred dollars and his time to travel there for the exam.

The federal government has the facilities to give such examinations in many cities throughout the country. Why can't the states use these facilities to give their own civil service tests? Prospective applicants could apply more easily, and the states would profit by a wider choice of candidates. It is a feasible arrangement whereby everyone concerned would profit.—HCEJ.

Consider Your Reception Room

IN OUR WANDERINGS about the chemical world of late, we have been taking special note of some of the uses to which main office lobbies and reception rooms are being put. The results have been most interesting.

The general appearance of these entrance halls to the chemical industry seems to range all the way from that of a cell in the Tombs to a corner of The Greatest Show On Earth. But most, we are glad to report, are in a reasonably pleasant in-between area.

Some display their products by various means, tastefully or otherwise. Others show photos or murals of their plants and operations. One has working dioramas of major plants. Some are elaborately appointed; others are quite plain. Rather surprising, however, a fair number either had no display, or what this visitor considered a very inadequate display, of either their products or their scope of operations.

It is well to remember that your reception room is frequently the first concrete impression a visitor gets of you and your company. It can be friendly and inviting, or it can be cold. It can be bright and neat, or it can be slovenly. It can, in other words, be almost anything you want to make it.

Moreover, it offers you free advertising space before a highly selective audience. The people who come into your reception room presumably do so because they are already interested in you or your products. They are in a receptive state to hear more about you and what you do. Here is your chance to capture their undivided attention, for a few minutes at least, with an attractive display showing the things you make or the services you render.

A little time and ingenuity can usually devise an interesting display of even the most prosaic products. Try to get away from the time-honored sample bottles if possible. If your space has the necessary depth, try a three dimensional arrangement. Better yet, call in a display expert; spread over a year or more, his price will not be exorbitant.

Rightly handled, your reception room can be an extra salesman and a real goodwill ambassador. Poorly handled, it will leave an impression you will have a hard time overcoming.—RLT.

Europe Wants U. S. Engineering

CHEMICAL ENGINEERING is one of the most prized American skills in Europe today, and dollars are available for payment for such services, according to Dr. Ralph Landau of the Scientific Design Co., Inc., who has just returned to this country after an extended European tour.

Conferences with British and continental chemical companies on their new expansion programs convinced Dr. Landau that American engineering—particularly chemical engineering—is held in great esteem.

"More and more European firms are turning to the United States for help in this field," he declares, "and even the most conservative grant America leadership in chemical technology. It is recognized that despite its many achievements the German chemical industry was inferior to the American from an engineering standpoint. A great opportunity awaits American contractors and consultants who are willing to study this European market and adapt their methods to its requirements."

Dr. Landau's comments may be of special interest to some chemical engineers now that dollars are obtainable for the purchase of American technical knowledge despite the currency controls which restrict importation of many American goods. A significant part of the recent British loan is earmarked for buying engineering skill.—RLT.

A RECENT SURVEY BY THE Manufacturing Chemists' Association shows that in 1945, 24 firms spent $10,760,379 on chemical research, equivalent to 2.63% of their net sales of $409,862,343.

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YOUR Texan is interested in his State's industrial development. He knows that there is advantage to both you and him when you decide to build your new plant on the Texas Coast — advantage to him through the industrial development of Texas' vast store of natural resources; advantage to you through having those resources available to you.

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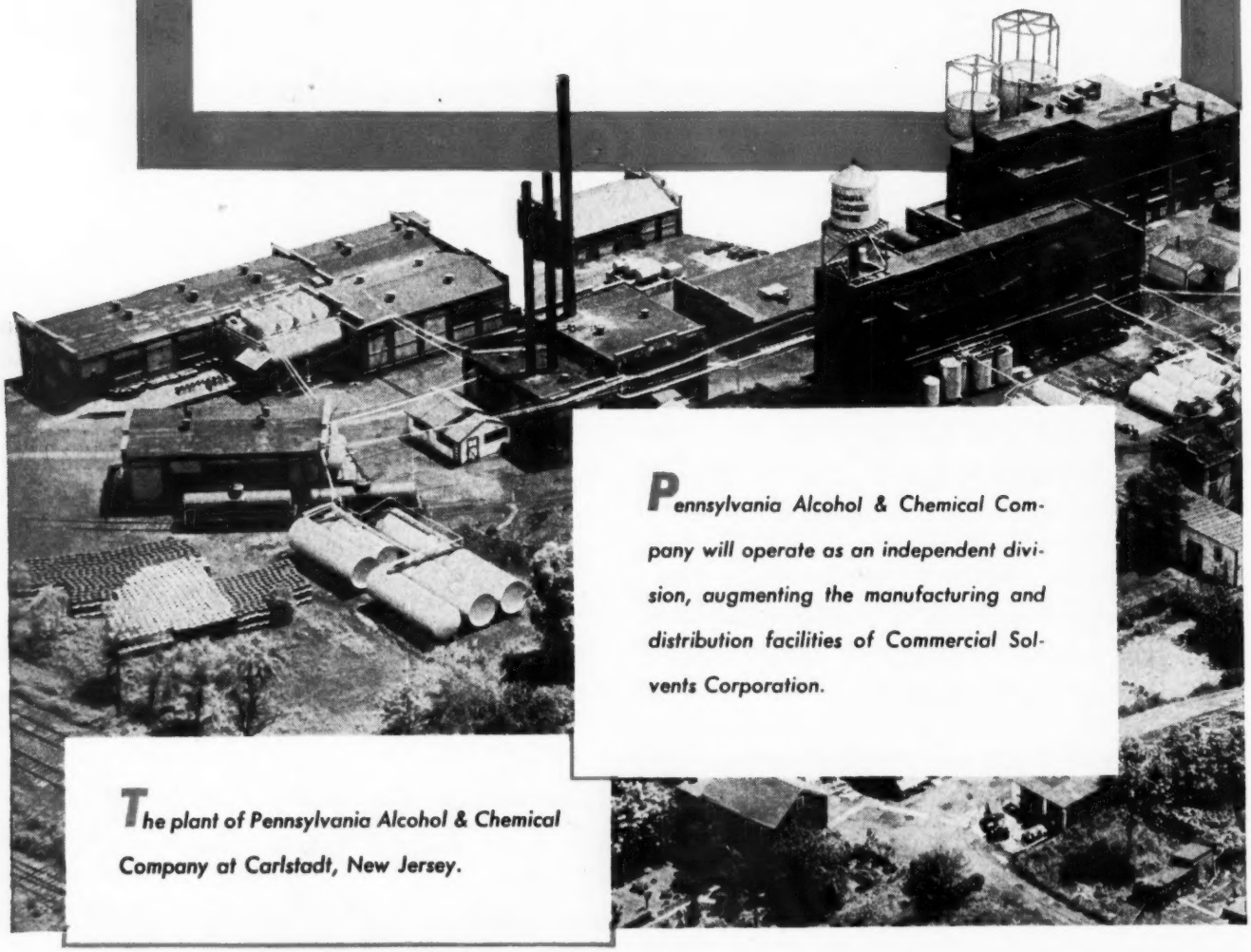

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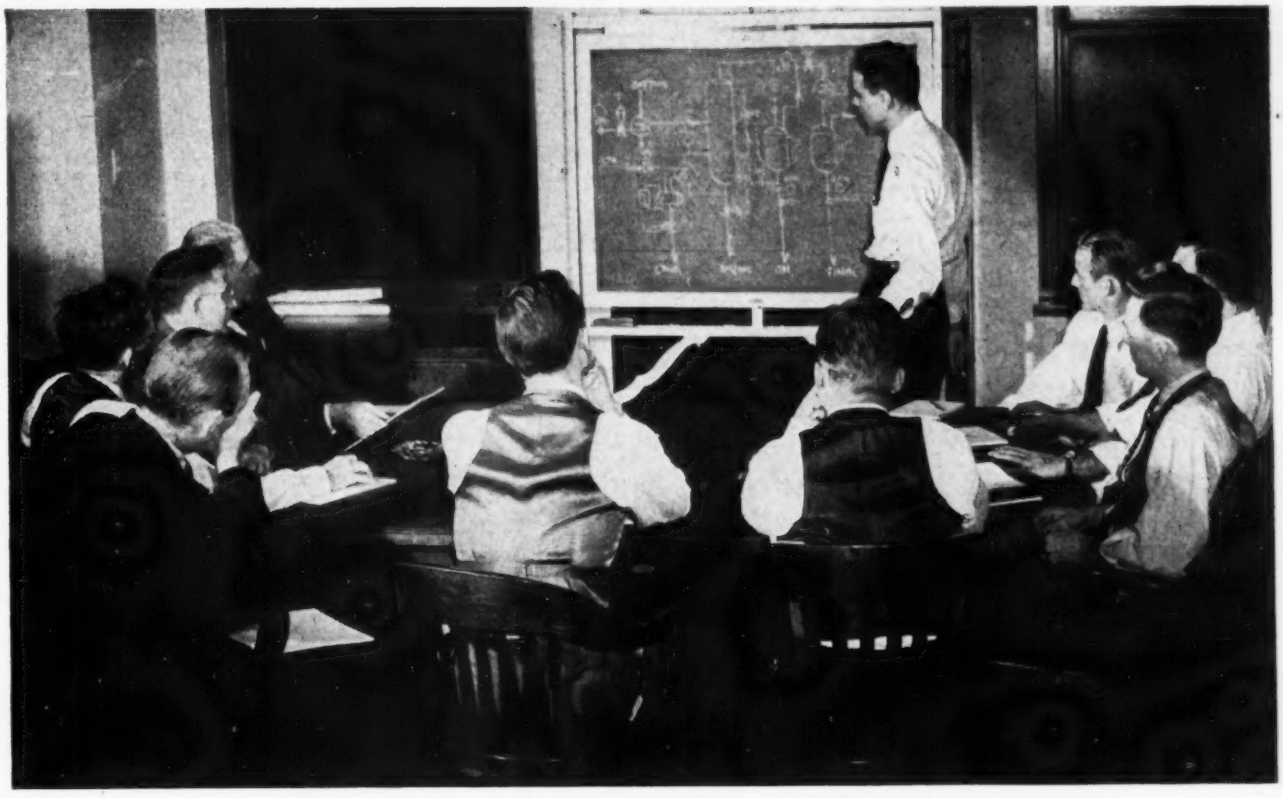


J. E. Cihlar, instrument engineer, leads a Jefferson Chemical Co. seminar on instrumentation.

On-the-Job Training for Chemical Engineers

by L. P. SCOVILLE, Chief Engineer
Jefferson Chemical Company, Inc.
New York, N. Y.

A GOOD ENGINEER'S EDUCATION never ends. Some chemical organizations are finding that facilities for continuous, on-the-job training of engineers can pay worthwhile dividends to all concerned. Here is how such a program is being carried out in the central engineering department of Jefferson Chemical Company, Inc. in New York.

IN BUILDING and maintaining a strong, efficient engineering group, it is imperative that the members have a good technical background. However, a diploma from a recognized engineering school is only the first requisite of a capable and successful engineer. To the fund of knowledge gained in school a great deal must be added in the way of practical engineering, human relations, economics, and similar skills usually acquired only through long experience.

The process of building up this background store of practical knowledge among younger engineers can be accelerated very appreciably by a planned, on-the-job training program. It is, of course, possible to hire engineers who have had industrial experience in the engineering organizations of other firms. Usually, however, the methods, organizational procedure and the particular type of work encountered with another employer do not fit wholly into the requirements of the new organization. So, regardless of whether experienced engineers or recent graduates are added to the department, a certain amount of training is usually necessary. The amount and type must be adjusted in accordance with the previous training and experience of the men.

Although the training program suggested in this article is primarily pointed toward developing college graduates either directly out of school or with intervening military service, the program may, with slight modifications, serve equally well to broaden experienced engineers and offer a means of keeping them advised of recent developments in processes and design methods.

THE EMPLOYER'S VIEWPOINT

Of major importance in instituting a training program is the selection of

trainees having the proper education background and personal attributes for development. Among the necessary qualifications, in addition to the obvious one of an excellent engineering education, are alertness, a practical mind, vision, orderly habits, a desire for knowledge, a congenial personality, common sense and judgment.

The ultimate purpose of a training program must next be considered. Jefferson Chemical Company, Inc., has decided that for a small to medium-size engineering department the most efficient organization is a group of chemical engineers with well rounded experience, each capable of handling the entire design of process units of major importance. Such an organization, as compared with a group of men each an expert in one or two narrow fields, offers the following advantages:

(1) A limited sphere of activity may cause an ambitious man to lose interest and become dissatisfied.
(2) Broad experience for each man adds greatly to the flexibility of the organization.
(3) A man who is an expert in only one or two narrow fields is not as good a prospect for advancement to a supervisory position as one who has had experience in all branches of the work.

Regardless of the care taken in the selection of trainees, there may be cases where a complete course of training cannot be justified. During the training period it may be discovered that the trainee lacks ambition, is weak in engineering judgment, evidences a desire to specialize in one or two fields to the exclusion of others, or exhibits personality traits making him unsuitable for broad responsibilities. In such a case, it will serve both the man's and the organization's best interests to remove him from the training program and allow him to specialize in his chosen field or transfer him to other work more suited to his capabilities.

Productive effort during the training period is an advantage to both the employer and the employee—to the employer since he is able to get a return for the money he is paying out as salary—to the employee because he will learn more quickly and remember the lessons longer if he is actually doing and not merely observing. In fact, during the early part of World War II when the pressure on process design engineers was greater than it had ever been before, certain young college graduates were able to assume the responsibility for important work in an unbelievably short period of time. While credit is due the inherent ability of these men, this rapid progress was also a result of the large mass of design work on which they assisted during their training period.

THE EMPLOYEE'S VIEWPOINT

Contrary to the condition existing before the war, it is now necessary to "sell" the college graduate on a job in order to get the higher quality of man. Furthermore, it is important that each engineer, experienced or inexperienced, maintain a vital interest in his job. One of the best ways of accomplishing both of these objectives is to offer a training program. This is clearly demonstrated by the interest aroused when, during the course of an employment interview, the subject of evening seminars is brought up.

"Engineers as a group have a great desire to learn. They have taken their degrees the hard way, and almost without exception they desire to become first class practitioners. A man of this sort is interested in his job only as long as he is learning."

Engineers as a group have a great desire to learn. They have taken their degrees the hard way—by passing a series of ever tougher courses when they might have obtained a diploma with much less effort if they had been satisfied with a liberal arts education. Almost without exception, they aspire to become first class engineers and recognize that their degree is just the first step.

A man of this sort is interested in his job only so long as he is learning. A short time ago an applicant for a position presented an application blank that indicated he had changed positions four times in the past six years. After some discussion, it was brought out that in his first job he had the misfortune of being assigned work of narrow scope in which he became quite efficient. Being unsuccessful in obtaining another assignment with Company "A," he resigned. Companies "B" and "C," his next two employers, learning of his proficiency in the particular line, put him into the same kind of work he had tried to get away from by leaving Company "A." This man finally returned to Company "A" and was able to be assigned a job of broad scope. He found, however, that others who had not been sidetracked were now about four years ahead of him in engineering knowledge and resultant responsibilities. A training program would have kept this man satisfied with the first company, and the result to the man would have been a better job at the end of six years. The result to the company would have been benefited by having a more useful engineer.

THE TRAINING PROGRAM

Jefferson Chemical Company, Inc., was formed about two years ago, and shortly thereafter the organization of its engineering department was undertaken. Due to the fact that none of the men forming the nucleus of the organization had ever worked together before, a definite training program for college graduates had to be postponed until the department as a whole had been organized and coordinated. However, plans for a program were made and are now being carried out.

Since Jefferson is a comparatively new organization, it has been necessary to employ a number of engineers with previous experience. Consequently, even though the training plans have been based on developing the young college graduate, the topics of discussion in the seminars are being selected to hold the interest of the experienced engineers as well as the recent graduates.

The program is not presented as original nor as a cure-all. It will undoubtedly be modified as it progresses. The general features, however, are known to be good for the reason that they are not new and have been applied to great advantage in other engineering organizations.

The plan may be subdivided into five major parts: Indoctrination, Familiarization with Available Data or Working Tools, General Engineering Methods and Procedures, Seminars, and Plant Experience. Each of these will be discussed below.

INDOCTRINATION

The first step is, of course, to describe the organization of the company as a whole, from the board of directors down to the office boy. The general aims and fields of interest of the company are also explained, as well as the general functions of other departments and their relation to the engineering department. The responsibilities of the engineering department and its internal organization are discussed in detail. Each trainee is impressed with the necessity of staying within his own sphere in his department and within the department's sphere in the company. The importance of a line organization is explained; the necessary conventions of such an organization are brought out and the reason given for each.

WORKING TOOLS

The next step is to acquaint the young engineer with the engineering data available in the department. Most engineering organizations have data books which are compilations of the wealth of data re-

quired by their engineers. The new employee must know what information is available, where to find it, and how to use it before he can hope to tackle any real problems. A good plan is to assign to the young engineer the job of bringing this data book, or one of the data books, up to date and to add new data. This is useful work, which at the same time familiarizes him with the information available and its limitations.

ENGINEERING METHODS

The young engineer must next be taught general engineering methods and procedures and be given the practical background so necessary. Following is a suggested list of subjects and order of presentation:

Accuracy
Neatness and Clarity
The Importance of Time
Methods of Attack
Letter Writing
Report Writing
Tabulating Data
Specification Writing
Dictation
Process Equipment
Approximate Designs or "Quickies"
Economics
Safety and Building Codes
Expediting and Coordination
Scheduling
Auxiliary Facilities

While some of the above topics may be discussed in the seminar sessions, which are covered later in this article, the most practical manner of approach has been found to be the supervision of the work of a young engineer by a senior engineer well versed in all of the fundamentals. Accordingly each junior engineer is assigned as an assistant to a senior engineer whom he aids in all phases of design, checking and coordination of a job. At the beginning of this association, the junior and senior engineers discuss the general scope of training to be given the junior and emphasis is given to the more important subjects.

While most of the topic headings are self descriptive, further comment on some might be helpful. It has been found that in most cases young engineers lack the ability to express themselves adequately in words. When a report is to be written, the senior engineer has the junior write the report, calls his attention to any possible lack of organization, lack of clarity or conciseness, or any other errors appearing in the draft. The importance of making a preliminary outline and then dictating from the outline is stressed in order to improve the organization of the report and to eliminate the time consumed in writing the entire paper out in longhand.

The writing of letters and telegrams is equally important. The novice's general tendency with a telegram is to reduce the number of words to such an extent as to sacrifice clarity. This is usually caused by overlooking the fact that the man at the other end does not have all of the background information available to the writer. In one case on a construction job, the following telegram was sent: "DEFER POURING PIPE SUPPORT FOUNDATION TYPE A PENDING RECEIPT REVISED DRAWING." To the sender this appeared perfectly clear. However, the field superintendent, on checking the drawings in an attempt to find the one referred to, found two drawings on which were indicated pipe supports, Type "A." Inasmuch as he was ready to pour one of these foundations, it was necessary for him to telephone the home office to find out which drawing was referred to. The cost of adding the drawing number to the telegram would have been repaid many times.

The use of tabulations to summarize the results of investigations is important inasmuch as they not only save the time of superiors reviewing the work but also save time for the engineer himself and materially aid in improving the accuracy of the calculations by pointing up discrepancies. For certain tabulations which are made in the course of design of any job, standard tabulation forms are made up and the use of them is required.

One of the most natural failings of young engineers is that of considering the process unit proper and neglecting the auxiliary facilities necessary to operate the unit. A young engineer, going over a supposedly complete design and estimate with his superior, was chagrined when asked the question, "What are you going to do with the product after you make it—carry it away in buckets?" He had forgotten the necessary transfer pumps, running lines, tankage and loading facilities for shipping the product the unit was designed to make. Less obvious, but still important, are other questions such as: Are the required capacities to furnish the necessary steam, power and water available? Are locker facilities available for the additional personnel? Are there any wastes or by-products to dispose of?

SEMINARS

Seminar sessions are held in the evening approximately once a week and all engineers are invited to attend. The pro-

A TYPICAL SEMINAR SCHEDULE

January	6	Flow diagrams: standard conventions, arrangement and types.
	13	Unit arrangements: economics, accessibility, operability and safety.
	20	General plant arrangement.
	27	General facilities—a general discussion.
February	3	Process, cooling, fire and domestic water systems.
	10	Fuel, steam and power.
	17	Tankage and transfer.
	24	Disposal of wastes.
March	3	Office, laboratory and locker facilities.
	10	Pumps and compressors.
	17	Pumps and compressors (Continued).
	24	Piping: specifications and practice.
	30	Piping: specifications and practice (Continued).
April	7	Pressure vessel design and codes.
	14	Drafting methods, standards, bills of materials.
	21	Procurement of equipment, analyses of bids.
	28	Scheduling a job.
May	5	Construction methods and organization.
	12	Start up procedures and manuals.
	19	Plant organization.
	26	Plant maintenance.
June	2	Safety and fire protection.

grams are usually in charge of one of the senior engineers. To a large extent, the subjects chosen are those appealing to the largest number in the group. The various members of the engineering department, and occasionally outstanding authorities from the outside, are requested to take charge of discussion. If one member of the department has just completed a particularly novel design problem, this may be selected for one of the meetings.

While the seminars are of great benefit to the young graduate, the programs are so selected that all members of the group may participate—the younger engineers presenting theoretical aspects of a problem while the older men fill in the practical viewpoint. This results in an interchange of information between the two experience groups which benefits both.

It is important to keep all members of the engineering organization informed of new projects under construction. If a new process unit or other addition to a plant is being built, a discussion of the project by the engineer in charge outlining the scope of the work, any novel features, and any unusual design problems, is not only interesting to the group but often results in suggestions which materially improve the design.

An outline of a typical group of seminars is given on page 215. However, the discussions may touch on any of the following fields:

Unit Operations
Unit Processes
Thermodynamics
Catalysis
Specifications
Safety
Process Equipment
Plant Layout
Auxiliary Facilities
Instrumentation
Operating Problems
Starting-Up Procedures

PLANT EXPERIENCE

One of the most valuable experiences for the young engineer is to get out in the plant and actually have contact with operations and particularly with the practical men who operate the plant. The opportunity to see at first hand the errors which were made in a design on which he worked and the operating difficulties which might have been eliminated if the design were only slightly different has the greatest value to any engineer and results in a better design on the next job even though of a different type of unit. Observing the headaches resulting from insufficient surge capacity or an improperly designed pump suction will effectively eliminate these faults in the next design.

Care must be taken in making plans for this field experience to avoid loss of engineering efficiency due to interruption of work, or a decrease in the plant's efficiency by an improper attitude on the part of the visiting engineer. The first is of importance if the location of the plant is remote from the engineering office and may be overcome by properly scheduling the visits. The most benefit and the least interference with design work can usually be obtained by spending some time in the field immediately before starting the design in order to develop the necessary plant background and obtain comments and suggestions from the plant personnel. Later, after construction is complete, a second visit will be helpful to both the plant and the engineer, the plant personnel having the benefit during the start-up operations of the engineer's knowledge of the details of design and the engineer obtaining first-hand knowledge of the operability of the unit.

Dow Chemical Co.

The young engineer should be encouraged to get out in the plant and actually have contact with operations.

An improper attitude on the part of the engineer during these visits can nullify all of the possible advantages. Before making a trip a new man should be briefed on the necessity of observing plant organizational procedure and clearing any suggestions he might have through the proper authorities. He should also be impressed with the fact that the plant personnel are operating men of considerable experience from whom he can learn a great deal, and that while his suggestions may appear good on paper they may not work out from a practical standpoint.

RESULTS OF THE PROGRAM

While it is too early to evaluate the results of the training program Jefferson is inaugurating, it appears from the results of other similar programs that the young engineers gain experience more rapidly, are more contented in their jobs, and ultimately develop into better engineers as a result of a plan such as that outlined herein. The importance of increasing the responsibilities of the trainee as he progresses cannot be over-emphasized. This will result in his realizing the advances he has made as a result of the training and also in his becoming able to assume even greater responsibilities as his knowledge and judgment increase.

While the above does not purport to give a complete recipe for training young engineers, experience has shown that the scope of training indicated is necessary if a well rounded engineer is desired. As to the general methods of training employed, some have been found to give excellent results in other engineering organizations. It may be found that parts of the program must be modified as the training progresses. No time limit for completion is indicated inasmuch as the period required for training will vary with individual graduates. Actually an engineer never completes his training and continues to learn something each day. The seminars can be varied enough to hold the interest of both experienced and inexperienced engineers. The college graduate can tell the man who has been out of school for a number of years a great deal about certain theoretical aspects while the experienced engineer can aid the graduate greatly in practical matters. Thus, the program actually results to the mutual satisfaction and gain of both the junior and senior engineers.

Methacrylonitrile from Isobutyl Alcohol

METHACRYLONITRILE, a possible source of methacrylic acid by hydrolysis, was being produced experimentally in Germany from isobutyl alcohol, according to the Bureau of Mines (Circular 7376). The work was carried out by I. G. Farbenindustrie.

Isobutyl alcohol, according to the Bureau's report, is oxidized through the aldehyde to isobutyric acid. This acid with ammonia is contacted over bauxite at 500° C. to obtain isobutyronitrile in 95% yield. The isobutyronitrile is chlorinated at 65-70° C. in a quartz tube by exposure to a mercury vapor lamp, the chlorine being added in such amounts that the chlorination does not exceed 40%. The product is distilled, and the first fraction, containing unconverted isobutyronitrile and "alpha-chloroisobutyronitrile" (BP 119° C.), is recycled to the chlorinator. A second fraction (160-170° C.), containing "beta-chloroisobutyronitrile" and an unknown "dichloroisobutyronitrile" is treated with 10% KOH. The beta compound splits off HCl, yielding methacrylonitrile I, which is separated by distillation. The dichloride residue is passed over TiO_2 at 420° C., yielding methacrylonitrile II, which is less pure. Yield of methacrylonitrile is about 75% on the butyric acid.

How American Cyanamid Handles Its RESEARCH REPORTS

by HOWARD C. E. JOHNSON*
Chemical Editor, Chemical Industries

IN A LARGE RESEARCH ORGANIZATION, where research reports are numerous and filing problems are thereby multiplied, it is preferable that reports be written when progress dictates rather than at arbitrary intervals. Flexible, and serving to exclude incomplete or repetitive information from the files, the system employed by the American Cyanamid Company embodies points of interest and usefulness to smaller organizations as well.

BY AND LARGE, research flourishes best in an atmosphere of freedom. Industrial research, especially, where the activities of a company often center about certain raw materials or certain lines of approach, profits from a free interchange of information among the research workers.

In a small organization much can be exchanged simply in conversation; but in a larger firm, where the number of technical men is large, or where research is carried out at several locations, personal communication is hindered. People come and go, moreover, carrying useful bits of knowledge with them, or questions come up in after years which require recourse to the original notes.

It is essential, then, that all research work be filed and indexed under every conceivable head in order that the fallible human factor be eliminated as much as possible. It is only in this way that the fruits of research can be fully utilized by the whole company organization.

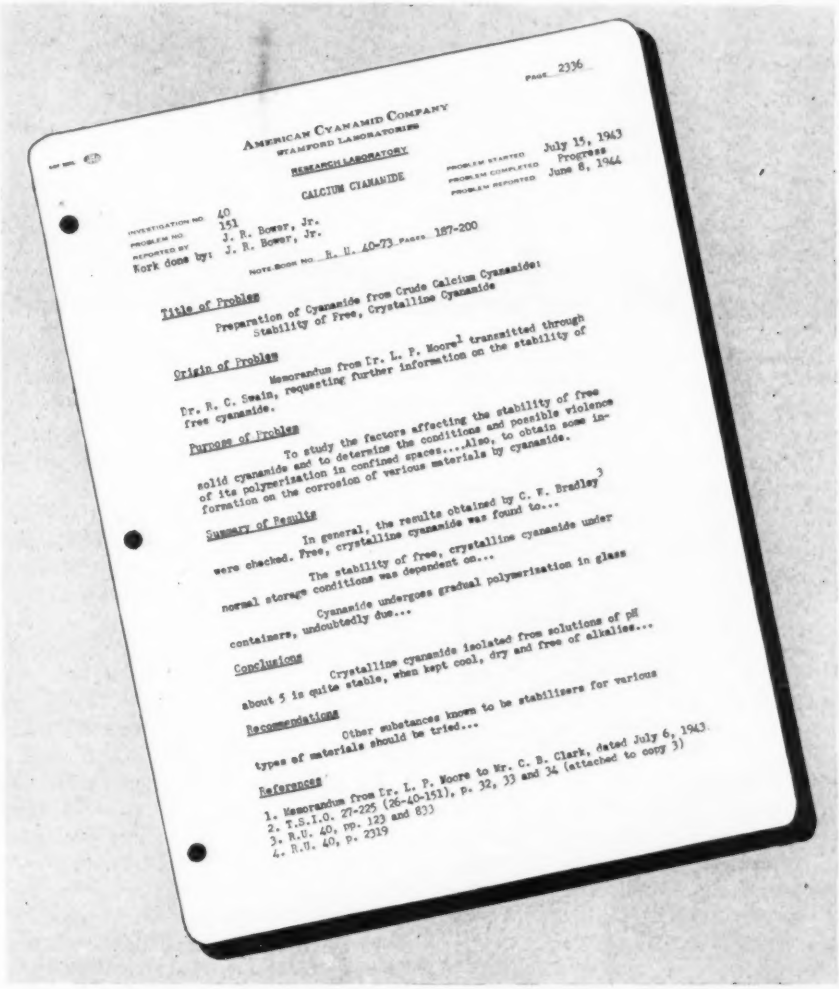
REPORT WRITING

In order to accomplish these desirable objectives, it is necessary to exercise care in writing reports so that extraneous material will not clutter up the files. It is impossible to do this if reports are written on a monthly basis. The end of the month may catch the research worker in the midst of a problem; his data may be too incomplete to warrant any conclusions or recommendations; and his next month's report, then, will be merely a rehash of preceding reports plus whatever additional data have been gathered in the current period.

To avoid these disadvantages, the American Cyanamid Company, at its Stamford Laboratories, requires that reports be written only when progress is substantial enough to warrant valid conclusions and recommendations; i.e., when development is sufficient to warrant inclusion in the files. (A group leader may ask for weekly or biweekly reports from his men so that he may keep abreast of the laboratory's work, but these reports are solely for his benefit.) They are then circulated to interested staff members, whose comments are filed with the reports.

The first page of each report contains the following information, assembled for the convenience of the reader:

1. Division from which the report issues
2. Investigation number
3. Problem number
4. Page
5. Author
6. Co-workers
7. Date work started and date work completed
8. Pages of the laboratory notebook in which the original records were kept
9. Title of the problem
10. Origin of the problem (at whose request



AMERICAN CYANAMID COMPANY
STAMFORD LABORATORIES
RESEARCH LABORATORY

CALCIUM CYANAMIDE

PROBLEM STARTED July 15, 1943
PROBLEM COMPLETED Progress
PROBLEM REPORTED June 8, 1944

INVESTIGATION NO. 40
PROBLEM NO. 151
REPORTED BY J. R. Bower, Jr.
Work done by: J. R. Bower, Jr.

NOTE BOOK NO. R. U. 40-73 Pages 187-200

Title of Problem
Preparation of Cyanamide from Crude Calcium Cyanamide:
Stability of Free, Crystalline Cyanamide

Origin of Problem
Memorandum from Dr. L. P. Moore[1] transmitted through Dr. R. C. Swain, requesting further information on the stability of free cyanamide.

Purpose of Problem
To study the factors affecting the stability of free solid cyanamide and to determine the conditions and possible violence of its polymerization in confined spaces...Also, to obtain some information on the corrosion of various materials by cyanamide.

Summary of Results
In general, the results obtained by C. W. Bradley[3] were checked. Free, crystalline cyanamide was found to...
The stability of free, crystalline cyanamide under normal storage conditions was dependent on...
Cyanamide undergoes gradual polymerization in glass containers, undoubtedly due...

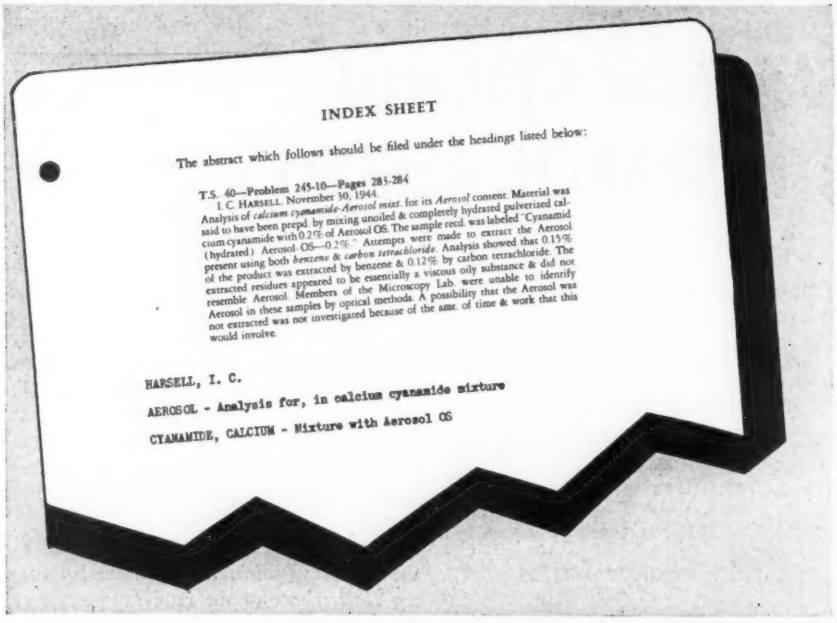
Conclusions
Crystalline cyanamide isolated from solutions of pH about 5 is quite stable, when kept cool, dry and free of alkalies...

Recommendations
Other substances known to be stabilizers for various types of materials should be tried...

References
1. Memorandum from Dr. L. P. Moore to Mr. C. B. Clark, dated July 6, 1943
2. T.S.I.O. 27-225 (26-40-151), p. 32, 33 and 34 (attached to copy 3)
3. R.U. 40, pp. 123 and 833
4. R.U. 40, p. 2319

This form is used for the first page of each report. The contents have been abbreviated to show on one page what material is brought together in the introductory portion of the work.

* Grateful acknowledgement is made to Miss Margaret Carlson, librarian of American Cyanamid Company's Stamford Laboratories, an interview with whom provided the basis for this article.



INDEX SHEET

The abstract which follows should be filed under the headings listed below:

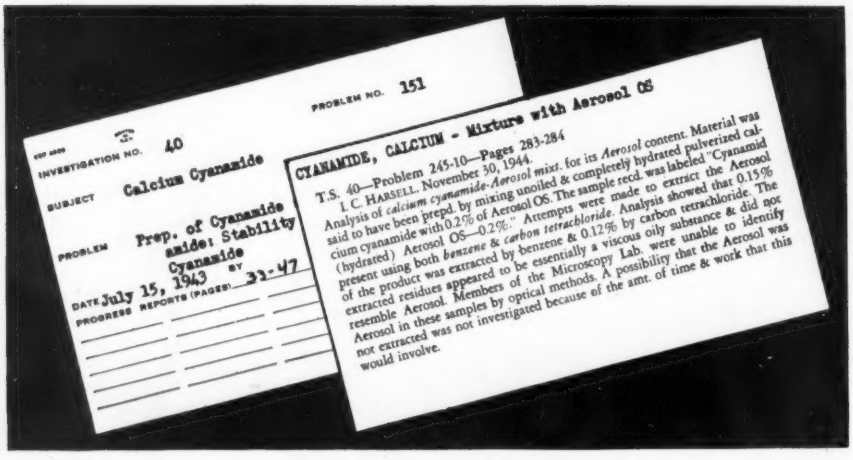
T.S. 40—Problem 245-10—Pages 283-284
I. C. HARSELL. November 30, 1944.
Analysis of *calcium cyanamide-Aerosol mixt.* for its *Aerosol* content. Material was said to have been prepd. by mixing unoiled & completely hydrated pulverized calcium cyanamide with 0.2% of Aerosol OS. The sample recd. was labeled "Cyanamid (hydrated) Aerosol OS—0.2%." Attempts were made to extract the Aerosol present using both *benzene* & *carbon tetrachloride*. Analysis showed that 0.15% of the product was extracted by benzene & 0.12% by carbon tetrachloride. The extracted residues appeared to be essentially a viscous oily substance & did not resemble Aerosol. Members of the Microscopy Lab. were unable to identify Aerosol in these samples by optical methods. A possibility that the Aerosol was not extracted was not investigated because of the amt. of time & work that this would involve.

HARSELL, I. C.

AEROSOL - Analysis for, in calcium cyanamide mixture

CYANAMIDE, CALCIUM - Mixture with Aerosol OS

Index headings are typed on this form according to subjects italicized by the abstractor. A similar form for indexing empirical formulas, where slips are likelier, is sent to the author.



PROBLEM NO. 151

INVESTIGATION NO. 40

SUBJECT Calcium Cyanamide

PROBLEM Prep. of Cyanamide: Stability Cyanamide

DATE July 15, 1943 BY

PROGRESS REPORTS (PAGES) 33-47

CYANAMIDE, CALCIUM - Mixture with Aerosol OS

T.S. 40—Problem 245-10—Pages 283-284
I. C. HARSELL. November 30, 1944.
Analysis of *calcium cyanamide-Aerosol mixt.* for its *Aerosol* content. Material was said to have been prepd. by mixing unoiled & completely hydrated pulverized calcium cyanamide with 0.2% of Aerosol OS. The sample recd. was labeled "Cyanamid (hydrated) Aerosol OS—0.2%." Attempts were made to extract the Aerosol present using both *benzene* & *carbon tetrachloride*. Analysis showed that 0.15% of the product was extracted by benzene & 0.12% by carbon tetrachloride. The extracted residues appeared to be essentially a viscous oily substance & did not resemble Aerosol. Members of the Microscopy Lab. were unable to identify Aerosol in these samples by optical methods. A possibility that the Aerosol was not extracted was not investigated because of the amt. of time & work that this would involve.

Left, index card filed by problem number lists all pages written on a particular problem. Abstract cards like sample at right are filed under author and all headings on index sheets.

the work was instigated)
11. Summary of results
12. Conclusions (Summary and conclusions may be combined.)
13. Recommendations (either for future work or that the project be dropped)
14. References (These include all literature and patent references as well as those to interoffice correspondence.)

MECHANICS

The work at Stamford is carried out by several divisions: Technical Service, Research, Physics, Chemical Engineering, Chemotherapy, Mineral Dressing, and Basic Nitrogen. Before the Company's technical activities were more or less centralized at Stamford, all investigational reports bore the identifying code letters "T. I.," meaning "Technical Investigation." Now each unit has its own identifying symbol for reports—"R. U." for "Research Unit," for example—and this symbol is followed by a number indicating the general subject of the investigation. The number 210, for instance, represents wetting agents. As problems arise within each of the 200-odd classifications, they are assigned consecutive numbers.

After the problem is completed and the report written, page numbers are assigned by the division office consecutively within one classification. Problem No. 3 on wetting agents in the Technical Service division, for example, may bear the identification T. S. 210, pp. 1-27, if it is the first one finished. Problem 1 may be completed next, and it will bear the page nos. 28-35. If the first report on Problem 3 recommended that another phase be more fully explored, the report on that work may appear, after other problems have been completed in the meantime, on pages 125-148. When the library has received enough reports from the technical service division on wetting agents to make a book, the reports are bound with the title "T. S. 210, pp. 1-240," and placed on the shelf with all the other 210's.

The disadvantage of this system is that reports are bound chronologically, albeit by division and general subject, rather than by problem number. This difficulty is circumvented by keeping a file by problem number, the card for each problem bearing notations of pages of all reports written on that particular problem. The advantages are obvious: reports are completely identified by volume title and page number, and chronological binding prevents accumulation of unbound reports.

INDEXING AND FILING

No report is more useful than its index is comprehensive. Each report at Stamford is abstracted in enough detail so that all of the important subjects in the report are included. Identical cards are filed under author, problem, subjects and empirical formulas. These are all in the library at Stamford, and it is planned to keep additional files at three other locations within the company as well as in the originating division office. A big factor here is having the complete abstract under each file heading, enabling the researcher to decide from the context whether he needs to consult the original.

Extensive filing requires an enormous number of cards. A report dealing with tests of 97 chemicals for insecticidal properties, say, will be filed under 97 names of chemicals and 97 empirical formulas as well as under any other subjects pertinent in the report. A time-saving innovation is printing rather than typing the cards, and filing is facilitated by having the abstractor italicize the key-words in the abstracts. Additional copies of the abstracts can also be run off on business-size paper, in which form they are very useful in preparing literature searches, and the same type can be used to print a periodic bulletin for circulation among the research staff.

BENEFIT TO TECHNICAL MEN

The system sounds like a lot of work. It must be borne in mind, however, that after the abstracts are prepared the work is largely mechanical. Much of the actual work, moreover, is lightened by using printing. These facilities happened to be available at Stamford, but other duplication processes could well be employed.

Another point is that Stamford is only one of the company locations at which technical work is done. The Stamford facilities are used to abstract, index and file technical communications from other units of the organization, helping thereby to correlate, and aid in the interchange of knowledge about, the firm's operations.

Most important, every hour spent in making records of accomplishments immediately and conveniently available to technical personnel saves incalculable hours of their high-priced time. Like an expensive piece of plant equipment, such a system of handling research reports may well pay for itself by the profits it produces.

POLYETHYLENE
A New Plastic Makes Rapid Progress

EDITORIAL STAFF REPORT

THE PLASTIC POLYMERS OF ETHYLENE came into prominence with their use as insulation for the high frequency electrical circuits required by radar. However, their unusual resistance to corrosion and their low water absorption promise application as coatings for chemical equipment and in packaging.

POLYETHYLENE plastic, polythene*, was first produced in the United States on a commercial scale in the early part of 1943. Its manufacture was started in that year by E. I. du Pont de Nemours & Co. at Belle, W. Va. and the Carbide and Carbon Chemicals Corp. at S. Charleston, W. Va. Du Pont's secondary processing facilities are located at Arlington, N. J., while Carbide's secondary unit is at Bound Brook, N. J. Since the War's end Du Pont has announced the construction of two other polyethylene plants: a polymerization unit as a part of the company's huge new development at Orange, Tex., and another secondary unit as part of the large plastics plant at Washington Bottoms, W. Va. Carbide's capacity at S. Charleston will be doubled as of the latter part of 1947 if construction proceeds according to schedule.

Polythenes are mixtures of long saturated straight-chain paraffin hydrocarbons. As manufactured in the United States they have molecular weights of 18,000-20,000 and a melting point of about 110°C. In common with many other linear polymers such as nylon, subjection to a tensile stress above a critical value (1,200-1,400 psi) elongates the material and irreversibly orients the molecules, increasing the tensile strength to as high as 25,000 psi.

The extremely good electrical properties of polythene account for what is probably its major use at the present time, namely as an electrical insulating material. Its good resistance to all kinds of chemicals points to use as a corrosion resistant material, either in the form of vessels made of polythene or as a coating material. One manufacturer has made the following broad claim: "Polythene is not dissolved by any known solvent at room temperature. Only a few have any noticeable effect upon it." Other applications include the preparation of water-resistant films for packaging and the formation of filaments and tubing.

At present the unmodified resin is selling for 53c per pound, while sheeting is selling for $1.25-1.40 per pound. Both are expected to go lower, and one source has it that the price may reach 25c per pound. However, another manufacturer considers this figure overly optimistic but considers that, except for polystyrene which is now selling for 25c per pound, polythene will be competitive with other plastics on a volume basis if not a weight basis. The specific gravity of polythene is less that that of water—0.92 as compared to 1.65 for polyvinylidene chloride.

DISCOVERY

The discovery of this unique polymer was made in England in the laboratories of Imperial Chemical Industries, Ltd.[1] in the course of an investigation of organic reactions at high pressures. Solid polyethylene was first observed in March, 1933. It appeared as a trace of white solid in a reaction vessel, which upon analysis gave the same C:H ratio as ethylene. Many difficult problems were encountered and solved before sufficient quantities for evaluation were obtained in December, 1935.

Eventually a continuous process for plant-scale manufacture resulted, and a pilot plant was completed in 1937. This operated at a pressure of over 1,000 atmospheres and a temperature of the order of 200°C. Such conditions alone are sufficient to create many problems, but when they are combined with the fact that extremely large quantities of heat are liberated by the strongly exothermic reaction, one has all of the elements of a difficult engineering problem.

FIRST USE

The similarity between the polymer prepared by ICI and gutta-percha suggested its first use as a filling material for submarine cable. By 1938 an experimental cable had been prepared, and on the basis of these results ICI decided to build a commercial unit in 1938.

At the time these developments in the production of polyethylene were taking place, radar was under intensive study elsewhere in England for use in case of war. These two projects came together at the beginning of the war when the first three months' production of polyethylene was delivered for radar use.

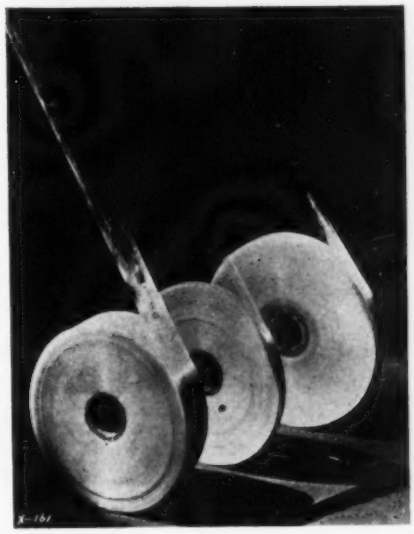
By the beginning of 1940 another war use, insulation of certain special underwater cables, was under development, but when the second commercial unit came into production in that year, radio-location uses had far outstripped all others.

OTHERS STEP IN

By 1940 the Germans (as represented by I. G. Farbenindustrie A-G) and the Americans had also become extremely interested in this non-reactive hydrocarbon product.

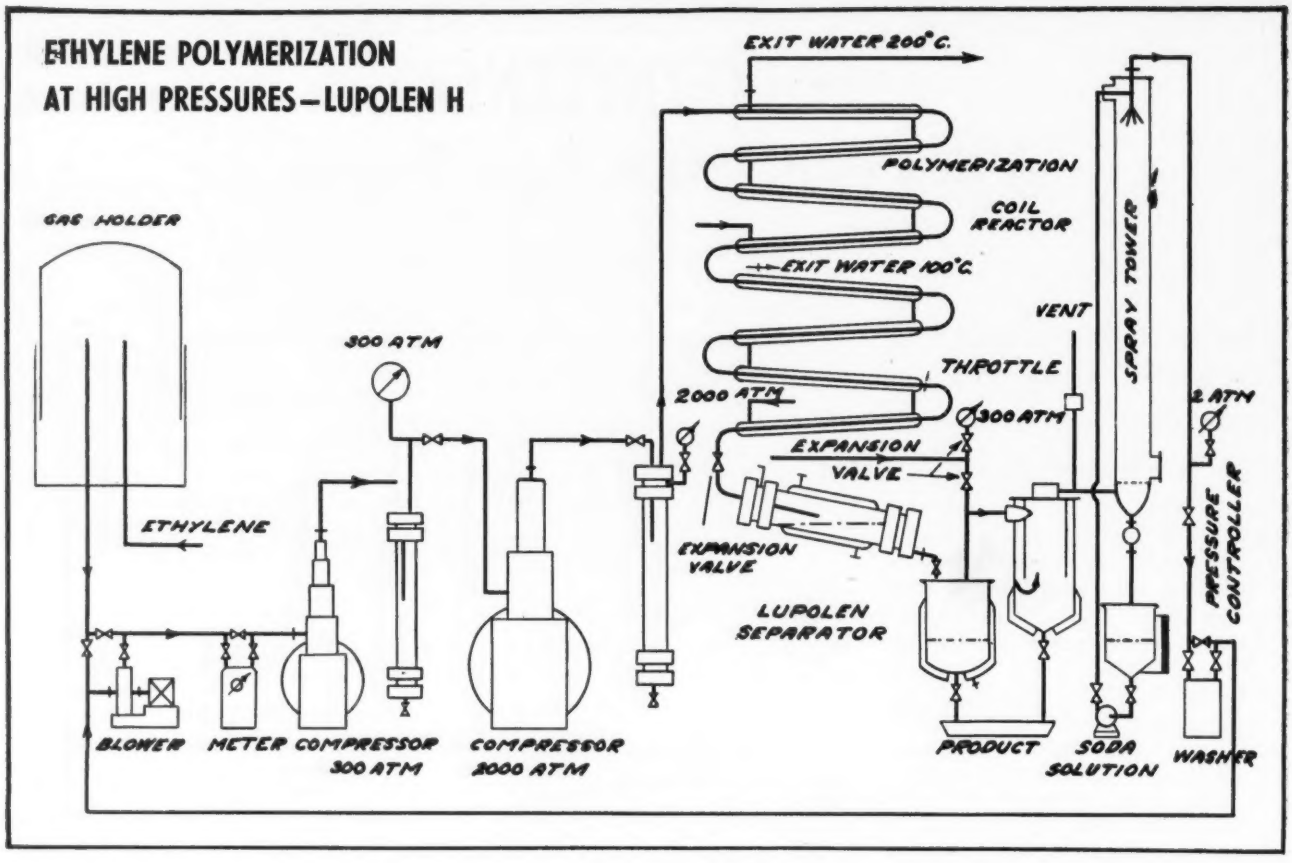
The early German work was directed along two lines. First, they were interested in duplicating the polymer obtained in England. Second, as they felt themselves somewhat restricted by ICI patents, they were interested in the development of procedures which would be independent of the scope of these patents, that is, carrying out the polymerization at pressures below 500 atmospheres.

In a report by Hopff and Goebel of I. G., as translated by Krase[4], mention is made of the fact that lack of description of equipment required to carry on the reaction set forth in the ICI patents



Transparent extruded tapes of polyethylene are very useful for patching insulated wires.

* Contrary to popular belief, the term polythene is not a trade mark but is a generic name. The polythenes have been defined as polymers of ethylene which are suitable for use as plastics.



made the German development start from the ground up. This report states further, "It was clear to us from the beginning that only a continuous process could be considered because only a relatively small fraction of the ethylene polymerized and the majority of the gas must be recirculated."

HOW THE AMERICANS DO IT

Few data have been published on the polymerization procedures which are in use in the United States. However, it has been reported that the first two plants, which began operation in 1943, utilized a pressure of about 1,200 atmospheres and a temperature of about 200°C. Although the British used ethylene produced by the cracking of ethanol, one American plant is reported to be using ethylene obtained by cracking petroleum-type hydrocarbons while the other uses ethylene from the fractionation of coke oven gases. Petroleum-based ethylene will be used in the new plants.

Courtesy E. I. du Pont de Nemours & Co.

The use of polyethylene films in packaging was presaged by this wartime use. Here the rifles were covered with a polyethylene film during landing operations to permit easy access to the trigger and still have the gun protected from salt water.

Although it has been reported that the polymer preferred in England is a composition blended with polyisobutylene[1], as compared with the relatively hard grade in use in the United States, it is understood that since the end of the war ICI has gone over to the manufacture of the hard grade, as it was no longer necessary to blend with polyisobutylene.

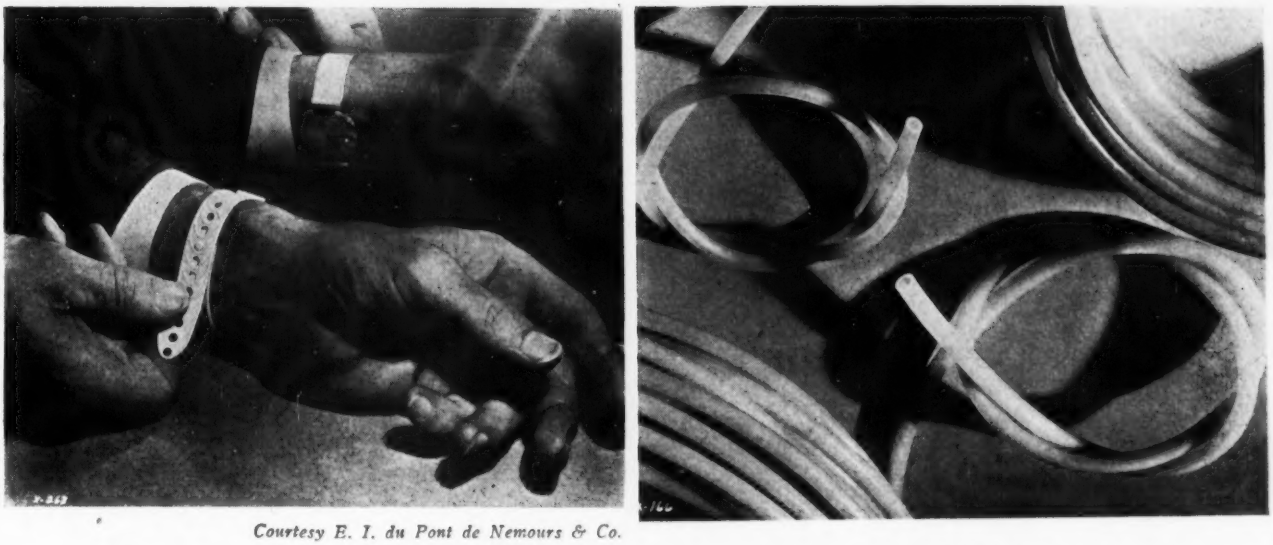
Much work was done in Germany on the development of processes for the low pressure polymerization of ethylene, either in emulsion[3] or in solution[4]. However, nothing other than relatively intensive developmental work has been reported for the United States.

LOW PRESSURE POLYMERIZATION

Experimentally the Germans found it possible to polymerize ethylene to solid products in the presence of organic solvents, and equipment was installed at Zweckel (10 tons per month) in 1941. The product of this polymerization procedure is a wax-like low molecular weight body known as I. G. Wax A, or Lupolen N.

Although early experiments indicated that ethylene contaminated with acetylene gave reduced yields, it was found before the completion of the 10-ton per month plant that acetylene concentrations between 0.1% and 0.3% had no noteworthy effect on the polymerization.

The average composition of the gas used was:



Courtesy E. I. du Pont de Nemours & Co.

There are many tasks for which polyethylene plastic is well suited, ranging from wrist watch bands to flexible tubing.

Ethylene, 98%
Ethane, 1-2%
Nitrogen 0.5-1%
Acetylene, 0.1-0.3%

PROCESS

To carry out the polymerization of ethylene in solution at Zweckel, a suspension of benzoyl peroxide (the catalyst) in methanol is brought to the suction side of the methanol pump by a circulating pump and the pressure of the mixture is raised to 200-300 atmospheres. The reaction is carried out at 110-120° C. in a tube coil (see flowsheet). From the tube coil the reaction product passes to a separator where the bulk of the polymer is removed. Aldehydes are removed from the unconverted ethylene in an alkali scrubber and the purified gas is recycled. Methanol is also recycled after distillation.

PRODUCT

The melting point of the wax produced by this process is 105-110° C., and the oxygen content lies between 0.7-1.3%. The molecular weight ranges from 2,000-3,000.[2] I. G. Wax A serves as a high quality wax for the production of polishing wax and as a show cream. However, polyethylene which is to be fabricated into cable insulation must be the higher polymer (molecular weight 15-20,000) which can only be produced by carrying out the polymerization at a much higher pressure and within the range covered by the ICI patents. Patents have been issued which cover the emulsion polymerization of ethylene[3] at low pressure but little information is at hand concerning the success of such processes.

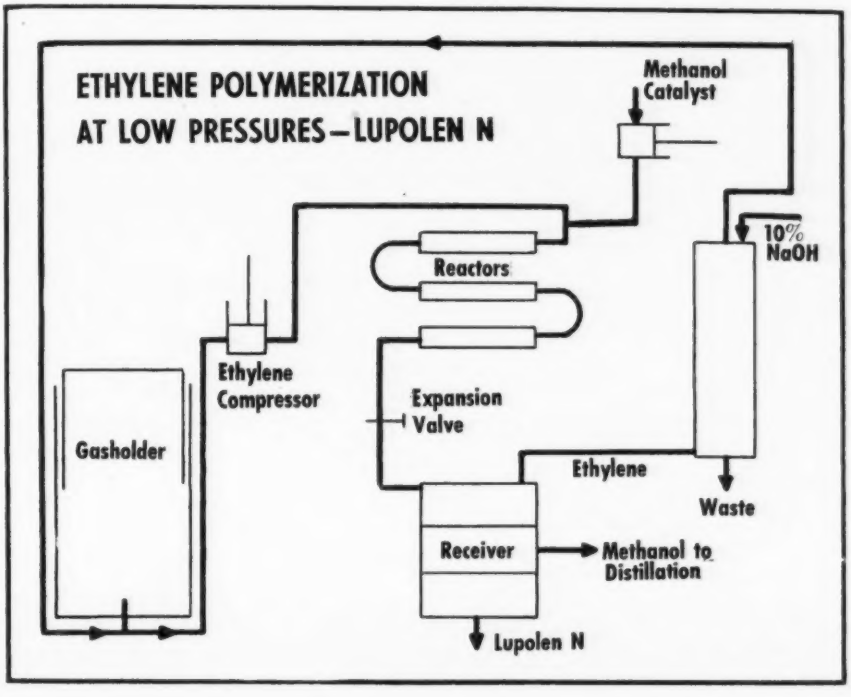
HIGH PRESSURE POLYMERIZATION

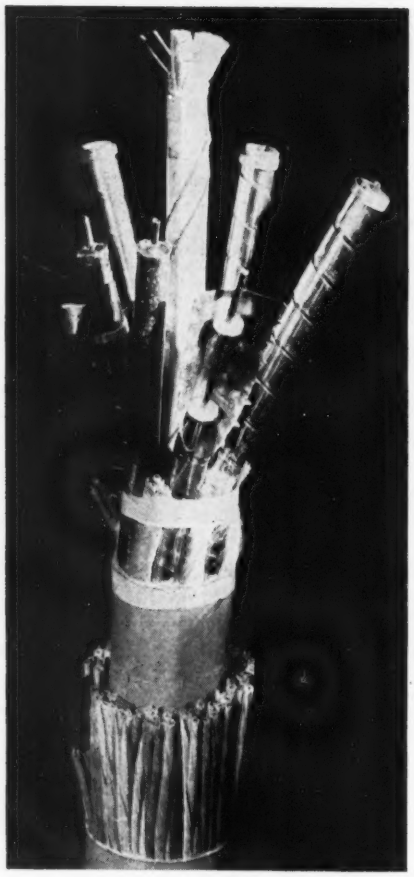
The polyethylene manufactured in the United States, England and at one of the ethylene polymerization units in Germany is produced at pressures varying from 1,000-2,000 atmospheres and temperatures of 180-200° C. However, the exact conditions employed are somewhat dependent upon the demands of the consumer.

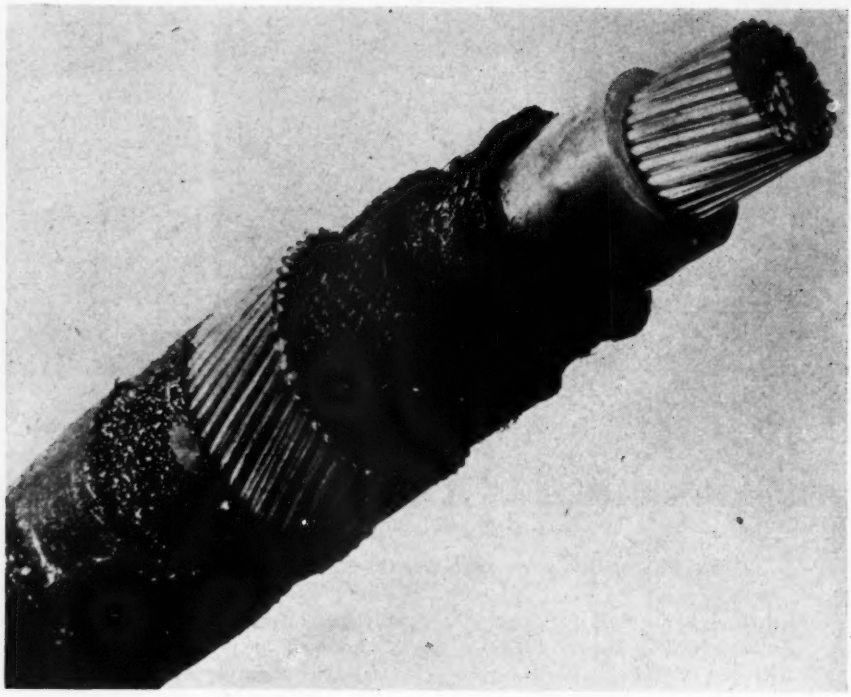
The plants in the United States stem from a visit[1] of an American delegation to the ICI plants in 1941. Manufacture started here in 1943. However, the first large use of the product in the United States began in 1940 with material supplied from England. This was as the insulation in a multi-channel trunk telephone line laid in 1940 by the Bell Telephone Co. The vicissitudes of war necessitated completion of this line with other insulating materials.

PROCESS

The high pressure polymerization of ethylene is a mass polymerization process catalyzed by 0.05%-0.10% oxygen. The reaction starts at 220° C. with cooling. In operation the ethylene gas is first compressed to 300 atmospheres and then raised to 1,500-2,000 atmospheres in still another compressor. In one of the German units the pipe of the coil in which the polymerization took place was 24 mm. in diameter and 80 m. long and had a volume of 40-50 ls. The product passed from the pipe coil to a separator which it entered at a pressure of 200 atmospheres. A gradual expanding valve was used to effect this expansion. The separated solid still contained dissolved gases at this pressure and was further expanded into a degasifying vessel where the polymer was drawn off in the liquid state. Still another separator was required for separation of the wax particles remaining in the gas stream before they passed to a

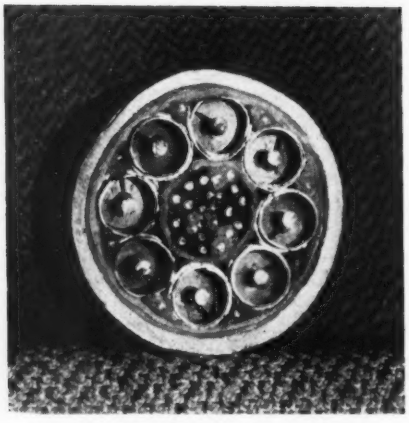






Courtesy E. I. du Pont de Nemours & Co., Inc.

Left: Exploded view of coaxial cable showing two of the polyethylene disc spacers in the center of the picture. An idea of the final shape and composition of the cable can be obtained from the cross section of the cable immediately below the exploded view. Above: Cross section of a 440-volt power cable insulated with polyethylene which has been in service for several years.



Courtesy Bell Telephone Labs., Inc.

lye wash which removed the formaldehyde and oily products resulting from the reaction. The effective yield of a plant of this type is 93-98% and the yield per pass is 8-15%.

ITS USES

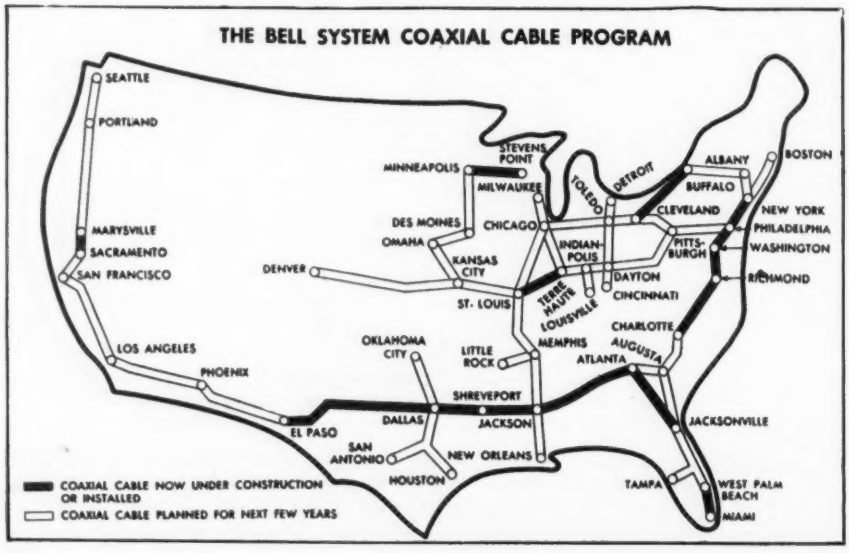
The first uses which were found for polyethylene depended on its excellent electrical characteristics. Its properties as a dielectric are particularly outstanding at the very high frequencies employed in radar and in the communication systems as represented by the many hundreds of miles of coaxial cable which have been installed in the United States by the Western Electric Co. for communication by telephone. It has been stated that a single coaxial cable is capable of carrying 480 conversations simultaneously, simply by carrying each conversation at a different frequency.

Among the drawbacks associated with the use of polyethylene electrical insulation are its low resistance to abrasion and a relatively low softening point—of the order of 100° C.

The extremely high resistance of the resin toward corrosion points to a variety of uses as a coating material if a suitable means of application can be developed. This very resistance to corrosion prevents application from a solution; melt coating is reported to be unsatisfactory, and flame-spraying has many drawbacks although satisfactory jobs can be produced.

The low absorption of water and the low rate of transmission of water vapor through polythene films and closures promises to provide a wide outlet in packaging applications.

The polymer can be spun into threads for weaving into highly resistant filter cloths, molded into a variety of forms for many uses which are too numerous to mention here. Suffice it to say that the major uses of this material will probably depend on its excellent electrical properties, its high corrosion resistance, and resistance to passage of water vapor.



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3. Hopff, Goebel and Rautenstrauch (to General Aniline and Film Corp.) U.S.P. 2,342,400.
4. "Polymerization of Ethylene," Hopff and Goebel, translated by Krase. FIAT Report No. 488.

No. 14 of a series on
INFORMATION SOURCES FOR CHEMICAL MARKET RESEARCH

REPORTING and PRESENTING Market Research Results

by ROBERT E. SESSIONS*

A RESEARCH REPORT IS THE FINAL LINK in a chain of communication. This chain begins with the considerations leading to the research assignment, extends through the several stages of the research job, and ends only when the findings are understood by those who must do something about it.

CRITICISM of market research sometimes becomes caustic when the subject turns to reporting and presenting the results. On this score the profession's best friends are apt to become bitter on such points as the needless details and bulkiness of the report, technical terminology, and a feeling of "so what?"

FIGURE I

WANTED: A PEACETIME MARKET FOR A WARTIME PRODUCT

Our production of MLV before the war was ....

....slightly less than 3% of peak war production.

after having plowed through tables, charts, cost curves and pages of formidable text.

Such criticisms are difficult to assess, individually; and it would be fruitless to attempt any one formula to meet *all* of the criticisms, even *some* of the time. In substance, however, those engaged in market research, more or less in common with all groups in technical research, are likely to do themselves and their work a great injustice through lack of "savvy" in reporting and presenting what they have done.

The thesis of this article is that a report is the final link in a chain of communication which begins with the considerations leading to the research assignment, extends through the several stages of the research job, and ends only when the findings are sufficiently understood by those who must do something about it. This means in substance that the report serves an administrative function, that like a bridge its design must be integral with the processes of research analysis and technique on one side and executive action and decision on the other.

In this perspective, sound reporting should be considered from three critical angles: (1) the administrative setting within which the report is authorized, completed, reviewed and used; (2) the principles of effective organization of the subject matter and (3) the devices of graphic presentation that can be employed to enlist interest, simplify complex subject matter, and drive home the major points.

I. THE ADMINISTRATIVE SETTING OF THE REPORT

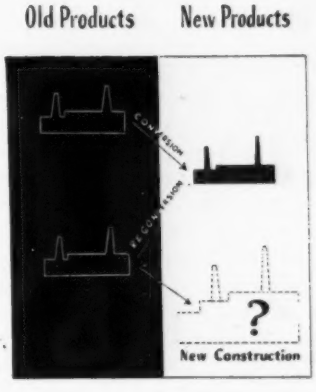
The majority of the criticisms of market research reports seem to be directed at those in two extreme categories. On one side are reports which are said to look as though they were written as an after-thought—a kind of necessary evil that had to be endured after winding up an otherwise interesting job of research. In the opposite corner are the *objet d'art* school from whom it would appear that the whole purpose of research was that of filling in a spectacular piece of presentation complete with four-color illustrations, dazzling charts and a handsome binding suitably framing the author's name.

Such comments suggest a problem considerably more fundamental than the physical appearance of a report. The presumption exists that the research group (whether company staff or outside organization) was unmindful of the particular administrative setting in which the function of reporting would be performed.

The point, essentially, is that any company acquires in time a distinctive set of standards and reacts through unique procedures which create an administrative

FIGURE II

We produced MLV for war use in plants normally serving an established peacetime market.



environment. This factor is important even in the matter of physical appearance mentioned above. In this sense, the report should not look "out of place" but should be styled in keeping with the best standards maintained by the company in other aspects of its work.

In a more important way, however, the administrative setting should be canvassed in advance to insure a fair and thoughtful consideration of the report at the time it is formally submitted.

The extent of such ground-work should depend, of course, on the general character and importance of the particular job. Is

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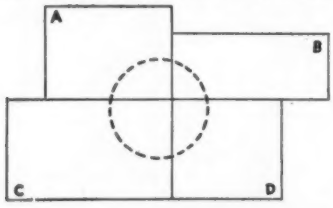
it possible to give some advance coaching to those who must use the report, on parts of it which would otherwise be too technical? If the report must be "reviewed" through one or more administrative levels before going to an operating department, can a preview be staged so that the substance and essential conclusions of the report can be threshed over, informally? If the final destination of the report is an operating department or an overly-busy executive, is it possible to time its submission to occur when the recipient will be relatively free to examine it? To those considerations one more must be added and is especially important where considerable time has elapsed since the assignment was first authorized: Have those who must read the report been reminded of the reasons that required its preparation, and have they been alerted

FIGURE III

Since there is no established peacetime demand for MLV...

...it was necessary to study the established markets of the principal products for which it can be substituted.



to other current problems or issues to which the report might be related?

These sentiments are intended to suggest more than that beauty is in the eye of the beholder. Within limits it is true that those reading a market research report will see in it something of what they have been prepared to expect. Beyond this, however, an acute awareness of the administrative setting throughout the conduct of the research, will do much to shape and color the final report in ways that will influence its favorable reception.

II. ORGANIZING THE MATERIAL

A clear and well-defined structure is, of course, essential to a sound report in any field. This axiom, however, seems especially difficult to observe in the case of market research. Inevitably, the materials are voluminous, and a simple interpretation of results has a way of becoming involved with explanations of how the data were collected and evaluated.

The fact remains that the primary message or central theme of the report must be conveyed in simple outline before the relevance of the detailed facts can be grasped; and such an outline should be expressed, unmistakably, through the structure of the report. The practical importance of this point is sufficient to justify special attention while the report is in draft form. For example, no more than fifteen or twenty minutes should be required for someone only familiar in a general way with the subject to grasp its essential framework.

As the term is used here, *structure* is not a consideration in the abstract but relates to the *design* with which the material and its analysis *should be built around the research assignment.* The primary problem of an organized presentation is that of visualizing the character of the issue, the type of action or the elements in the proposed decision which first created the need for the research and, therefore, prompted the assignmnt. With this in mind the material can be organized more consistently in terms of management's problem and the facts on which a decision can be based.

The tools included in a well organized report are also the hallmark of the craftsman in sound reporting. While these must vary with the nature of the problem and the scope of the job, the following should be regarded as fairly standard equipage:

1. A table of contents that reads like a topical outline.
2. A crisp opening statement of the precise terms of the assignment—stated in such a way as to break the problem down into a series of questions.
3. A summary of conclusions so expressed as to respond to the questions, qualified, however, in each case where the data are inadequate.
4. A liberal use of appendices to avoid encumbering the text, but systematically keyed to invite and not discourage reference.

This general approach to the organization of market research material goes a long way to avoid some of the most telling criticisms of our group. Chief among these is that we often write for our own amazement—that we are prone to discourse at length on some aspect of theory or technique for which the assignment is

STANDARD EQUIPMENT FOR MARKET REPORTS

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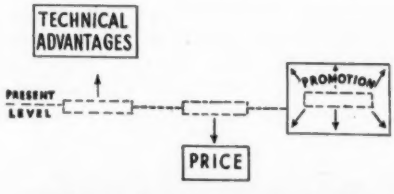
FIGURE IV

MLV will be substituted for other products in these fields primarily because of

TECHNICAL ADVANTAGES
PRICE
PROMOTION

The market for MLV will expand...



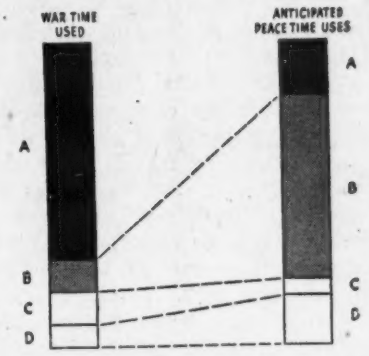
...as the product is improved, the price is decreased and promotion is intensified in the selected markets

more of a springboard than a destination.

Another foible is that of straining to justify the inclusion of essentially irrelevant material because it has been expensive to collect and ought not to be "wasted." Worst of all, we are sometimes charged with diverting attention from points where information is deficient, by

FIGURE V

The four principal uses for MLV rank very differently in war and peace



Use A-Essential in war but MLV too high priced for peace time use

Use B-Luxury products curtailed by war in which MLV offer great advantages

overwhelming the reader with data on points that can be supported abundantly.

In the great majority of such cases, the authors of the reports were not given to guile in the use of material. They had simply lost sight of the fact that the test of a sound report is whether it provides the basis for a wiser decision than could have been made without it.

III. DEVICES OF GRAPHIC PRESENTATION

As a rule the most successful market research reports are those in which graphic materials are used extensively. In such cases the choice of the graphic device and its location in the report have been determined by a searching consideration of the precise function the particular device should perform.

The most important of these functions are illustrated in the series that is displayed throughout this article. While examples could be multiplied, the functions can as a rule be summarized under four headings:

1. To enlist and hold interest. (Figures I through IV.)
2. To establish visually a set of relationships that are complex and which would therefore be time-consuming to explain verbally. (Figure V.)
3. To give added emphasis to a major point. (Figure VI.)
4. To summarize a mass of otherwise tedious detail. (Figure VII.)

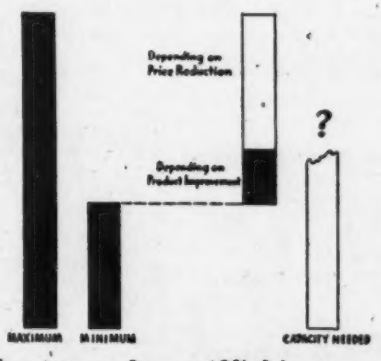
The art of graphics in exposition has grown luxuriantly in recent years. Even so, its potentialities have scarcely been touched. From the standpoint of someone who must absorb the subject quickly and settle on the essential issues with assurance, a judicious use of graphics comes as nothing short of a God-send.

And for the research group the advantages are equally pronounced. The problem of conceiving the graphic form best suited to the point that must be made, is in itself an important aid to keen analysis. The researcher requires of himself the hard discipline of taking that final step in the crystallization of an idea. The greatest value of graphics, however, consists in their use in pointing up and cementing the structure of the report. They make it possible to get into the subject quickly and to proceed from one point to the next without loss of perspective and without sacrificing the relative value of the supporting data.

The use of graphic devices, however, should be undertaken with considerable restraint due to the fact already noted that the history of this form of exposition is still a comparatively brief one. In a number of instances for example, a preoccupation with the techniques of presentation has been such that the charts, diagrams or other devices were more difficult to understand than the points they were designed to put across. In other situations the visual materials, while valid in themselves, were not clearly enough related to the over-all structure of the report, so that their net effect was to invite digression rather than to promote coherence and climax in unfolding the main thesis.

FIGURE VI

The forecast of the maximum annual sales of MLV is 320,000 barrels or nearly as much as wartime production.

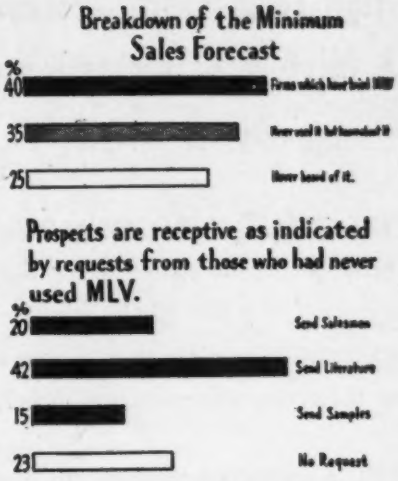


The minimum figure is 42% of the maximum. The capacity needed would lie somewhere between the maximum and the minimum.

In purely practical terms it is perhaps most important of all to make certain that the visuals are in some degree within the observation or experience of the audience to which the presentation is beamed. For example, reports prepared for a company in the chemical industry

FIGURE VII

Since little is known of MLV intensive education is needed



can borrow from the prolific mass of chart-types of chemistry and the art-forms of engineering design which are well understood by the operators in that field; and the same principle can be applied to equal advantage in any industry or commercial field—bearing in mind always that the choice of the exhibit should be influenced by a regard for "what comes naturally" to the people who must understand it.

If the graphics are valid individually, if they contribute clarity and coherence to the structure of the report, and if the forms are familiar images to the readership, they can be used to produce still another dividend. That is (in reports of special importance), duplicates of the key charts, graphs, diagrams and other graphic materials can be pulled together and incorporated at the beginning of the report as a visual summary of its essentials.

The charts accompanying this article were selected and prepared in such a way as to serve this secondary purpose. In that case management was faced with deciding whether the industrial market would support an expansion of plant for a new chemical developed in wartime but virtually unknown to civilian industry. The type of problem—an evaluation of the potential for a new product measured by its displacement of established products—is as technical in its content as any confronting the market researcher. The type of managerial decision—investment in new plant to produce for the industrial market—is as crucial as any which executives are called upon to make.

Even so, communication was successfully established and maintained between the research and executive group by the use of this graphic series. It is highly doubtful whether any other method would have made it possible to proceed from origin to destination with so few delays and so little loss of direction along the way.

THE CATAROLE PROCESS

High Temperature Cracking Produces A Mixture of Aromatic and Olefinic Hydrocarbons

EDITORIAL STAFF REPORT

THE CATAROLE PROCESS PRODUCES a 50:50 mixture of non-condensible gases, principally olefins, and a highly aromatic liquid product from which many different aromatic hydrocarbons can be isolated. Such a process should be useful in supplementing the present short supply of aromatic chemicals, at the same time producing olefinic hydrocarbons for aliphatic chemicals.

THE thermal treatment of petroleum hydrocarbons in the United States has been directed principally toward the production of high quality motor fuel at the lowest possible cost. In recent years, however, the emphasis has shifted in the direction of concomitant production of certain specific hydrocarbons, such as toluene, butylene and ethylene. This, in addition to the reqiurement for 100-octane fuel during the War, has led to the employment of catalysts and higher operating temperatures in the cracking process as it is now carried out in the United States.

A further step in the employment of higher operating temperatures is now being taken in England where a plant is under construction to produce a mixture of about half aromatic and half non-condensible olefinic hydrocarbons by cracking naphtha at a temperature of 600-700° C.

Known as the Catarole process, the operation has been under experimental and pilot plant development by Dr. Chaim Weizmann and his associates since 1941, and in 1945 exclusive rights to the patents for the United Kingdom and certain European and overseas countries were acquired by Petrocarbon, Ltd. In September, 1946, the Finance Corp. for Industry, Ltd., an organization formed under government auspices with the backing of a group of London banking firms, agreed to provide 2,000,000 pounds for a commercial plant. It is estimated that this plant will begin operation the first part of 1948.

The commercial unit is to be constructed and operated by Petrochemicals, Ltd., a wholly owned subsidiary of Petrocarbon, Ltd., near Manchester in one of the most highly industrialized areas in England on a 700 acre tract. This tract is larger than that required for the Catarole plant alone and will provide space for users of the raw materials produced. The tract borders on the Manchester ship canal which provides direct access for ocean-going tankers via Liverpool.

The initial capacity of the plant is designed to handle 50,000 tons of charging stock per year, with provisions for a later expansion to 100,000 tons.

REACTION

The pilot plant in which design data has been gathered has a capacity of 0.8 tons of charge per 24 hours. It consists of a vaporization coil and a number of reactors packed with copper. The use of copper is said to reduce the temperature required for substantial aromatization to 630-680° C. and also to reduce the formation of carbon. The packed reactors are contained in gas-heated furnaces, the burners of which are fed by cracking gas. The hot vapors from the reactors are quenched and the liquid content condensed. The offgas then passes through gas-liquid separators and gas scrubbers.

Operating pressure is slightly above atmospheric, and runs are generally for a period of 60-70 hours, after which the carbon deposit is burned off by recirculating flue gases mixed with fresh air. This regeneration takes about 10 hours, giving an operating cycle of 60-70 hours on stream and 10 hours regeneration.

PRODUCT

The proportion of gaseous to liquid products can be varied within relatively wide limits by the selection of appropriate charging stocks. In general the more paraffinic the charging stock the greater the proportion of gaseous products, and the more naphthenic or aromatic the charging stock the greater the proportion of liquid products. Another way to increase the proportion of liquid products is to increase the boiling point of the charging stock. These generalizations are borne out by the analyses given in Table I. In general, hydrocarbons boiling in the naphtha and gas oil range are expected to be the principal raw materials for the process.

The reaction product is largely free from sulphur, nitrogen and oxygen compounds, even if they were present in the charging stock. Processing losses are of the order of 0.5-1.0%, consisting mainly of the hydrocarbons which produce the carbon deposit on the catalyst.

GASEOUS PRODUCT

It is reported that the percentage of olefinic hydrocarbons in the gas is appreciably higher than in normal cracking gases. The gas is particularly rich in ethylene and propylene. These gases

TABLE 1

VARIATION OF PRODUCT YIELD WITH TYPE OF CRUDE

	Naphthenic Texas Naphtha	*Paraffinic Iranian Naphtha*	*Paraffinic Iranian Kerosene*
Boiling Range (Engler) 5%–95%	95°–205° C	113°–183° C	175°–261° C
Density 20° C.	0.799	0.756	0.796
	Yields in percent by weight calculated on total products. (Processing losses approx. 1%)		
GASEOUS PRODUCTS			
Hydrogen	0.5	0.9	0.5
Methane	18.3	24.0	13.7
Ethylene	7.4	11.6	11.6
Ethane	6.5	9.6	7.4
Propylene	9.0	10.6	10.9
Propane	1.9	1.3	1.4
Butylene	4.8	4.5	3.9
Butane	1.3	0.8	0.5
Total gases	50	63	50
LIQUID PRODUCTS			
Below Benzene	1.1	0.4	1.0
Benzene Fraction	11.0	6.1	7.5
Toluene Fraction	11.0	6.5	7.5
Xylene Fraction	6.0	5.1	5.8
Alkyl Benzene Fraction	2.6	4.5	9.4
Naphthalene Fraction	3.5	2.5	3.7
Alkyl Naphthalene Fraction	4.0	2.7	3.8
Anthracene Fraction	2.7	2.6	2.3
Chrysene Fraction	2.4	2.6	1.6
Pitch (Residue)	6.0	4.0	7.5
Total liquid products	50	37	50
REFINED PRODUCTS			
Naphthalene	2.3	1.2	1.7
Anthracene	0.2	0.1	0.15
Phenanthrene (80%)	0.5	0.3	0.4
Chrysene	0.3	0.2	0.2
Pyrene	0.2	0.1	0.15

are condensed by means of refrigeration and then fractionated.

LIQUID PRODUCT

The liquid products of the Catarole cracking process can best be considered in three classes: (1) those boiling below 200° C., (2) those boiling above 200° C., and (3) a pitch residue which remains after completion of the distillation.

1. Below 200° C. This fraction is usually still further separated into six fractions, namely, (a) an olefinic fraction, (b) a benzene fraction, (c) a toluene fraction, (d) a xylene fraction, (e) an alkyl benzene fraction, and (f) a naphthalene fraction.

a. Olefinic fraction. A small head fraction containing cyclopentadiene, isoprene and various pentenes is produced. Hydrogenation of this fraction produces an 84-octane fuel additive of the isopentane type.

b. Benzene fraction. A benzene fulfilling all of the requirements of the British and similar nitration grade specifications can be obtained by refractionation, preferably, but not necessarily, by azeotropic distillation with methanol.

c. Toluene fraction. A nitration grade toluene fulfilling all specification requirements is obtained in a similar manner from the toluene fraction.

d. Xylene fraction. Apart from the xylene content the xylene fraction consists of some ethylbenzene and about 20% styrene. Further fractionation will concentrate the styrene up to about 50-60%. A satisfactory polymer can then be obtained from this concentrated solution, after which the residue will produce 2°, 3°, or 5° xylol as desired.

e. Alkyl benzene fraction. This fraction contains about 50% of polymerizable bodies consisting mainly of indene and isopropenyl benzene. A process has been worked out to obtain a hard and light-fast resin from this material by polymerization. According to tests this is an excellent material for incorporation into varnishes. The remainder of this fraction constitutes a valuable aromatic solvent.

f. Naphthalene fraction. Naphthalene crystallizes from this fraction and is separated by centrifugation. After a slight washing this naphthalene is sufficiently pure for the production of phthalic anhydride. Treatment with a small amount of aluminum chloride produces a pure naphthalene for sulphonation.

2. Above 200° C. This fraction is further fractionated into an alkyl naphthalene cut, an anthracene cut, and a chrysenepyrene fraction.

a. Alkyl naphthalenes. This fraction contains 1- and 2-methyl naphthalene, 1:2, 1:6, 1:7, 2:6 methyl naphthalenes, various trimethyl-naphthalenes, diphenyl, acenaphthene and fluorene. Fractionation produces a monomethyl naphthalene cut, diphenyl, a dimethyl-naphthalene cut, acenaphthene, a trimethyl-naphthalene cut and finally fluorene. The yields calculated as % by weight of the alkyl naphthalene cut are as follows:

1—methyl naphthalene	16.4
2—methyl naphthalene	24.5
Diphenyl	4.1
Dimethyl naphthalenes	30.4
Acenaphthene	3.6
Trimethyl naphthalenes	18.0
Fluorene	3.2

b. Anthracene. A mixture containing all the anthracene and a great part of the phenanthrene crystallizes from the crude cut. By refractionation of the mother liquors a further quantity of phenanthrene is obtained. From the crystalline part of the fraction very pure anthracene of melting point above 210° C. is obtained by two crystallizations from toluene. Phenanthrene remains in the toluene mother liquors and after purification, phenanthrene of 80% purity is recovered.

c. Chrysene-pyrene. Chrysene crystallizes spontaneously from this fraction. Refractionation of the crystalline cut produces nearly pure pyrene.

3. Pitch Residue. The residue from the distillation of the liquid fraction is a valuable starting material for the production of electrode coke because of the low inorganic content of coke from the pitch (0.01-0.015%).

PATENTS

1. British P.	552,115
2. British P.	552,216
3. British P.	575,383
4. British P.	575,768
5. British P.	575,769
6. U. S. P.	2,329,672
7. U. S. P.	2,349,781
8. U. S. P.	2,354,163
9. U. S. P.	2,384,984
10. U. S. P.	2,397,715

HOW I.G. MADE ALLYL ALCOHOL

ALLYL ALCOHOL, basic material used in the manufacture of glycerine, allyl plastics, etc., was made during the war by I. G. Farbenindustrie A. G. by means of a process quite similar to U. S. practice. The Bureau of Mines, in reporting on investigations conducted by the Technical Oil Mission, details the conversion of allyl chloride to allyl alcohol by the method charted (right).

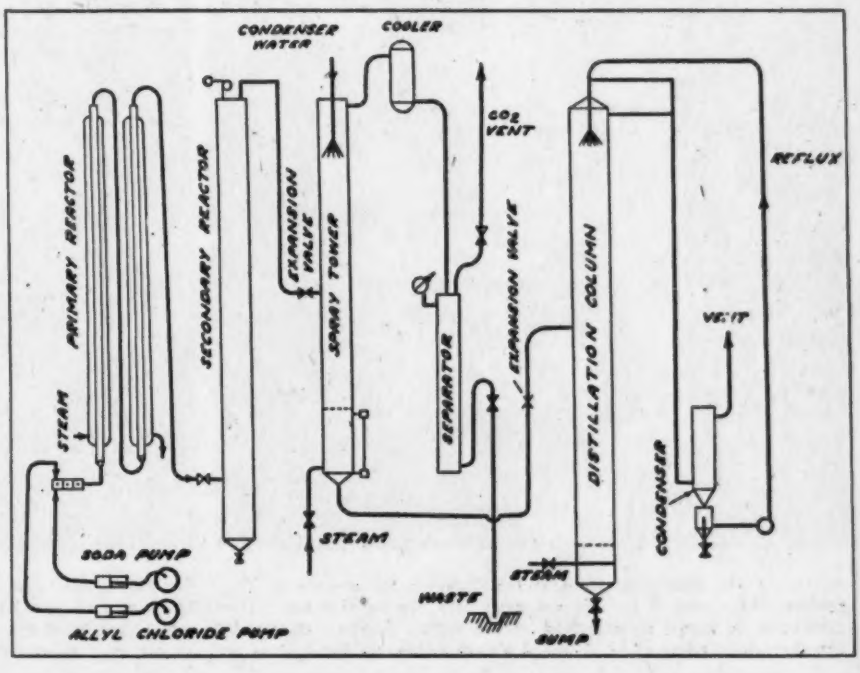
Soda solution (1.25 m³/h of 2.5 normal) is preheated to 130-140 C. and mixed with 250 liters per hour of allyl chloride.

This mixture passes into a steam-jacketed reactor, maintained at 150 C., and flows into a secondary reactor. Contact time is estimated at 20-30 minutes, and pressure is kept at 10-11 atm.

The reaction mixture is expanded to 8 atmospheres into a spray tower in which the liquid phase separates from the carbon dioxide. The gases pass through a cooler separator and are then vented.

The liquid phase is charged to a distillation column heated by direct steam injection where an azeotrope (250 liters per hour) containing 30 per cent water and 70 per cent allyl alcohol is taken overhead.

The allyl alcohol frequently contains small quantities—up to 1.5 per cent—of diallyl ether. The salt solutions leaving the column should have a slightly alkaline reaction and contain no alcohol.



Dust Studies Simplified by New Laboratory Duster

INSECTICIDES IS ONLY ONE OF THE FIELDS which will benefit from the use of a new laboratory duster designed to give reproducible results by eliminating capricious factors. Deposition, adhesion, drifting, rate of settle and toxicity are some of the characteristics of dusts which may be studied.

AFFORDING nearly complete control of generated dust clouds, a new laboratory duster has been developed for dust studies by agricultural chemical technologists at the Whitemarsh Research Laboratories of the Pennsylvania Salt Manufacturing Company.

Main features of the new duster are embodied in two assemblies—a new air measuring device and a new dust distributor combined with a conventional tower and sampling chamber. The design of the two new assemblies combines to give the new duster three distinct advantages: the dust sample holder completely empties, thus making sure that the entire sample of dust is used in each test; the air pressure is constant; and the amount of air used is measured exactly, making possible comparable replicates.

In testing numerous raw materials to develop insecticide and fungicide dusts to do specific agricultural jobs, the Pennsalt scientists found that conventional laboratory dusters were subject to many uncontrollable variables.

The conventional dusters had a tendency to shoot the dust into the tower almost in too compact a stream, often resulting in undesirable agglomerates. Frequently, no matter how carefully the original amount of powder was measured, an appreciable percentage would be left in the dust sample holder. The cloud would remain "bunched" unevenly in the tower and not disintegrate into a uniform dust cloud. And, no matter how carefully preparations were made, tests could not always be duplicated.

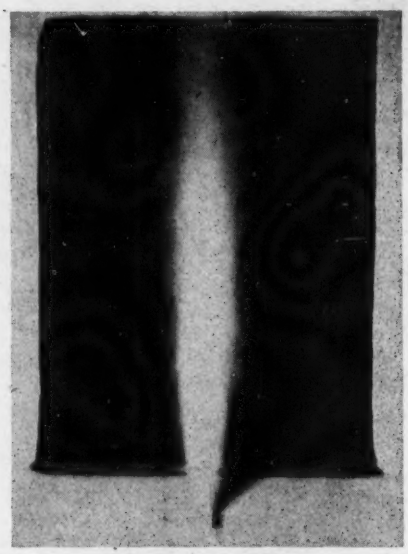
The new duster, developed in stages with members of the Pennsalt research staff contributing, eliminates many uncertainties and limits tests to variables which can be more accurately controlled.

The dust tower and sampling chamber are standard, built from plans published for most laboratory dusters with but a few slight modifications.

The tower is a conventional tube 15 inches in diameter and five feet high, mounted over a sample collecting chamber 18 x 18 x 17 inches. This chamber is constructed so that slides can be inserted to study dust fractions, or plants may be put in for direct dusting.

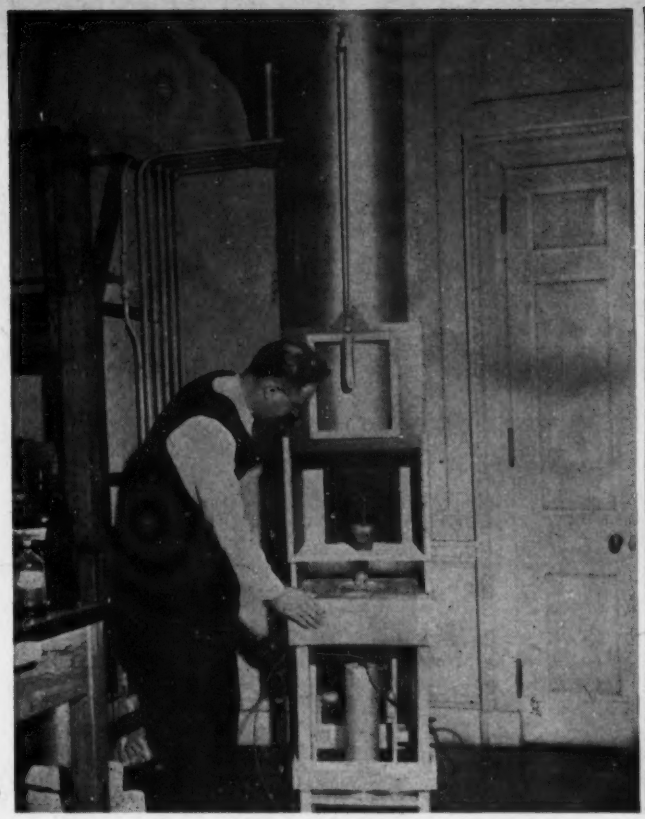
MEASURED AIR

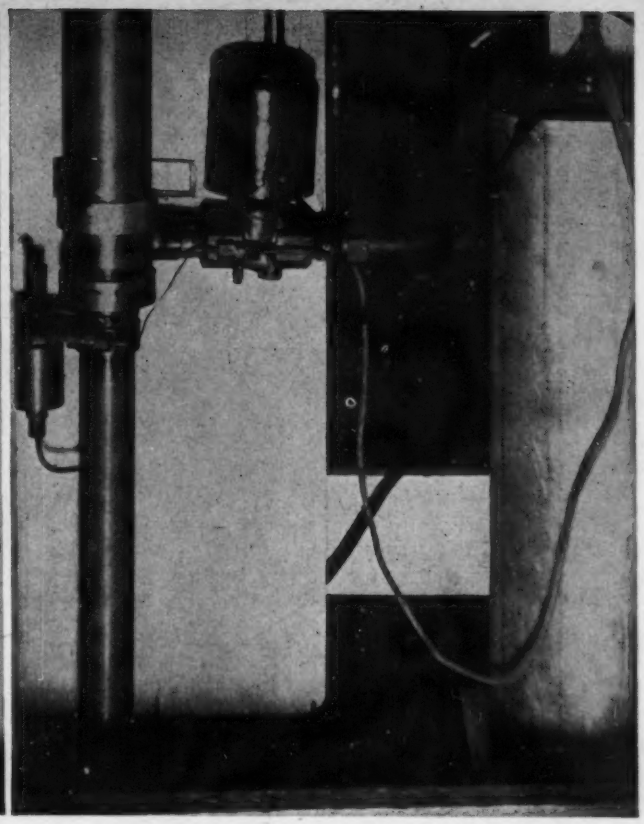
To assure uniform air pressure for each test, a special air measuring device



New distributor gives highly dispersed cloud.

At left is the plastic sample holder and distributor assembly. The sample holder tube at top extends down into the air chamber. The distributor is shown disassembled at the right. Reading clockwise, the three long tubes at 12, 4 and 8 o'clock extend to the bottom of the dust sample tube and give the dust its initial push. The shorter tubes at 2, 6 and 10 o'clock enter the sample tube about an inch and a half from the bottom and break up the sample with a blast of air as it is carried past the vents by the pressure from below.





The testing tower is shown in operation at the left. Under the sampling chamber, here containing a plant for dusting, can be seen the plastic dust distributor which breaks up the sample as it is shot into the five-foot high tower. Under the table is the air tank and solenoid control, a close-up of which appears at the right. The pressure tank is at the extreme right, the control mechanism at the left.

is mounted beneath a small table under the sample collecting chamber. This consists of a tank, of about two cubic feet capacity, in which air pressure can be regulated. The exact amount of air in the tank is regulated by pressure gauges. The duster can be operated from the compressed air supply in the laboratory or by a compressed gas cylinder. The air from the pressure tank acts on a piston which drives air into the dust distributor. This air supply is controlled by a solenoid valve with a trigger button on the front of the sample collecting chamber.

DUST DISTRIBUTOR

Perhaps the most important development in the Whitemarsh duster is the new distributor. This is a small cylinder of clear plastic screwed into the top of the air pipe and pointing up through the sampling chamber into the tower. It is 2 inches in diameter by 3⅝ inches long.

In the bottom of the cylinder is a ball check valve to prevent back draft. Above this is an air chamber. Extending into this air chamber from the top is the dust sample tube into which measured quantities of the dust can be poured through a small, detachable funnel. Three small air pipes extend from just below the top of the air chamber into the bottom of the dust tube to provide the original motivating push. Three shorter pipes, also starting from near the top of the air chamber, enter the dust tube one inch up from the bottom of the tube.

These three shorter tubes break up the dust charge thoroughly as it is pushed past them by pressure from the three long tubes.

WHY IT WAS DEVELOPED

The duster was developed at Whitemarsh Laboratories to evaluate raw materials for insecticides and fungicide dusts and to improve quality of commercial products. It is used both in evaluating characteristics of numerous dust bases and in studying finished dusts for deposition, phytotoxicity and toxic efficiency.

One of the most important problems in developing these insecticide and fungicide dusts and dust bases—the type which makes up the largest volume used in combating pests in America's vast acreage of row crops—is determining the proper vehicle for carrying the active ingredient so that it will be the most efficient insect or fungus destroyer.

Of the vast number of clays, talcs and other diluents the technologist has to choose from, he must first select the one chemically most harmonious with the insecticide. For example, alkaline diluents are not compatible with DDT.

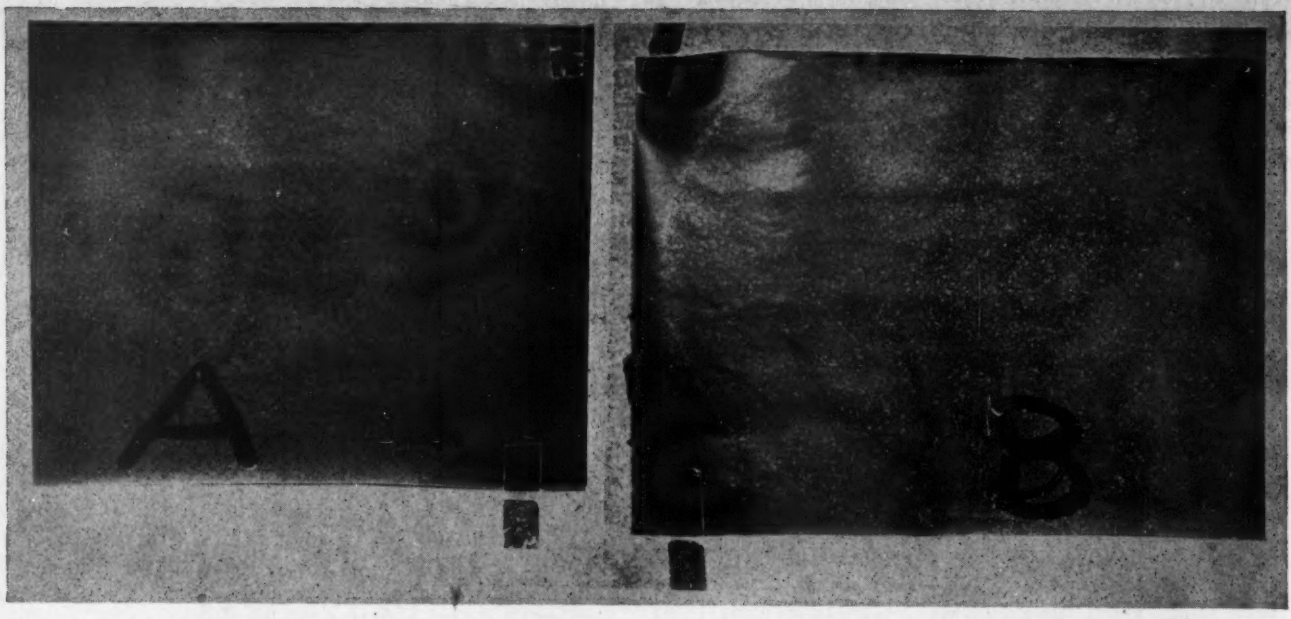
His next problem is to determine the mechanical properties most suitable for a given dust. These include grindability, ability to hold the active ingredient, flowability, dusting quality and particle size, all of which are determined by the raw materials and methods of manufacture. Although these properties can be controlled in making the dusts, Pennsalt scientists found something more accurate than field tests was needed for determining the specific suitability of a given product.

WHAT TESTS SHOW

Among many factors now being tested at Whitemarsh with the new dust tower are:

1. Type of deposit. Does the dust settle evenly or in globs?
2. Sticking ability. Will it cling to foliage or be shaken easily to the ground?
3. Drifting. When being applied will a large percentage be carried away by the wind?
4. Rate of settle. In airplane dusting, will it settle fast enough to cover crops it is intended for?
5. Toxicity. All mechanical factors being satisfactory in one type, will that type do the best insecticide or fungicide job it is planned for?

Accuracy of the new duster permits tests for all these factors to be duplicated enough times to give conclusive results. Settling patterns, photographed on black slides, give an accurate picture of the rate of settle and type of deposit. Tests with one dust can be repeated, withdraw-



Sample "A", at the left, shows the even distribution and fine powdering of dust samples, settled on a black slide in the new duster. In sample "B", at the right, dust was shot into the tower from a plain tube, without the distributor. Distribution is more uneven and the sample more haphazard, as attested to by the heavy white specks visible, which are agglomerations of undispersed dust from the sample.

ing slides at varying intervals, to determine the amount of coarse and fine fraction, which is related to drifting. Different kinds of foliage can be subjected to identical dust showers to determine which type of dust is most effective. Identical tests can be repeated on plants covered with different kinds of insects to determine toxicity.

APPLICATION OF TESTS

Importance of these tests can be seen in the case of cryolite. This Greenland mineral, when refined and powdered, is a very effective insect poison, but it must be ingested by the insect. Size of particles has to be small enough for this, yet large enough to settle, cover and stick to the plant.

DDT by itself is not an efficient dusting insecticide, so Pennsalt research men had to determine the proper size and type dust particles to carry this insecticide to the insect. During this year similar experiments have been carried out extensively in selecting the right vehicles for HCCH (hexachlorcyclohexane).

Although at Whitemarsh its value is chiefly in developing and testing insecticides and fungicides, it is believed the new machine might have numerous other applications in dust studies—for example, in developing dust respirators, in studying fly-ash control and many others.

Acknowledgement is made to the Pennsylvania Salt Manufacturing Company for permission to publish information on this equipment. Certain matters of novelty are recognized and patent protection is being obtained by this company.

FRENCH and BRITISH Chemical Plants Rebuilding

IN SPITE OF MANPOWER AND MATERIAL SHORTAGES, inconvenient working conditions and poor communications, the French chemical industry is moving ahead to recovery. The same is true of England, despite austerity and red tape, according to Walker Penfield, just returned from Europe.

POLITICAL unrest and lack of confidence in the government of France are retarding industrial postwar recovery in that country, French chemical manufacturers told Walker Penfield, manager of manufacturing of the Pennsylvania Salt Manufacturing Company, on his recent visit to Europe.

Mr. Penfield, who spent two months in Europe exchanging technical information with British, Danish and French chemical companies, said he found that recovery is being pushed as rapidly as possible, but that because of the tremendous destruction of material things and the impact on men's minds, industrial recuperation can be expected to be slower this time than after World War I. General business recovery more than 17 months since the end of the war in Europe is now up to about 65 per cent of the pre-war level, he said.

"Nearly all French chemical management people with whom I talked," said Mr. Penfield, "told me their efforts to regain prewar production were hampered by uncertainty of the government's nationalization program and, at present, talk of further devaluation of the franc.

"It is the view of some Frenchmen that the present poor leadership of France is due in large part to the casualties of World War I. They point out that many of the finest types of Frenchmen were killed and that the potential good leaders who were killed would at present be old enough to wield the greatest influence of their lives.

"The government does not enjoy the confidence of industry because of the restrictive legislation that has been passed," Mr. Penfield said. "If the political situation clears, however, recovery should be rapid, as France's position with respect to chemical raw materials and manufacturing facilities is good.

"The fear of Russia hangs over Europe like a grim and gloomy mantle. It is expected that Russia will attempt to dominate Europe by spreading Com-

munism. There is no indication of a united effort to counteract the Russian influence."

RESEARCH RETARDED

Mr. Penfield said French chemists told him their companies suffered a six-year delay in their development programs. As would be expected, the Germans during the occupation forced them to produce the things they required, thus wearing out plants and equipment, but would not permit them to rebuild, expand and grow through research and development, he was told. The French chemical industry, however, was so situated that it was relatively undamaged by actual warfare, and what war damage there was is being repaired with government financial help.

Another obstacle Mr. Penfield found in French plants was the serious shortage of chemical workers. As a result, he reported, many plants still are using German prisoners of war assigned for this work. When these are repatriated, it is likely that manufacturers will be forced to hire foreign labor.

Because of France's need for foreign currency, credit and a more favorable trade balance, Mr. Penfield said, the government is forced to export many manufactured products and materials needed at home. For example, in one chemical factory he visited, considerable maintenance costs could be avoided and production increased by the use of a certain type of steel. However, the government feels it must export all this type of steel produced in France, forcing the chemical plant to use an inferior material.

The fuel situation in France is serious because little coal is being imported from England and the United States. The mines on the Continent are not producing enough to make up for the deficiency because of critical shortages of mining equipment and workers. A large number of Polish and Italians who worked in the mines before the war are no longer available. The French believe that about three years will be required to get coal production to a level high enough to supply industrial and household requirements. The drought in Savoy, which began toward the end of the summer, has continued; the generation of hydro-electric power is therefore considerably less than normal. This has resulted in serious reduction of output of electro-chemicals.

RAILROADS OPERATING

In France, generally, Mr. Penfield reported, war damage is being rapidly repaired. It is most advanced in transportation, which is due in no small part to the work of Allied engineers in restoring bombed-out lines of communication during the war. Railroads and other means of transportation are operating very well. Next in importance from the government standpoint seems to be communications, but as yet they are not at the level necessary for proper conduct of business. Then comes restoration of France's industrial facilities, many of which are coming along very well. This is being speeded in some instances by plant equipment transported as reparations from German factories in the French zone of occupation.

"Because scarcities are so universal, there is no reason for cartels at present; but it is nevertheless of interest to note the prevailing opinion that as long as Germany remains impotent, there is little chance that the cartel system will be revived in Europe," Mr. Penfield said.

"It would be difficult for the average American business man to imagine the difficulties of conducting daily business in Europe," said Mr. Penfield. "This is particularly bad in France where the telephone service, never good before the war, has deteriorated during the occupation to such a degree that now long-distance calls are more a nuisance than a help. In England, where by comparison the telephone service is excellent, its convenience is considerably less than that of the service enjoyed in the United States.

DISCOMFORT AND RED TAPE

"Deliveries of essential materials and equipment in Europe are much longer than in the United States, and the degree of governmental regulation is similar to the most stringent in the United States during the war. There are many government reports to be filed. All of this reduces the efficiency of the business executive so that his effectiveness is perhaps not more than a quarter of what we have grown accustomed to here. I do not take into account the discomfort of unheated and poorly-lighted offices for the reason that Europeans are used to these conditions, and while at first they make a great impression on an American, it is doubtful that they actually interfere with the efficiency of those who have become accustomed to those conditions at home as well as at work.

"Despite the petty annoyances and the fact that most Britons are tired of their government's austerity program, there is a healthy attitude among the British and betterment is apparent," Mr. Penfield said.

"There is a general feeling that the government is honest in its efforts, and British chemical manufacturers have found that they can lay their plans along the definite programs so far outlined by the government. There is much farsighted planning and technical skill in evidence in the industry in England."

Walker Penfield, for a number of years in research, development and engineering positions with Pennsylvania Salt, was named last year as the firm's manager of manufacturing.

SOLVENT DRYING OF LUMBER

A NEW method of drying lumber said to be four times as fast as ordinary kiln-drying procedure is now in the pilot plant stage. Albert Hermann and A. B. Anderson, head and chief research chemist, respectively, of the Western Pine Association laboratories in Portland, Ore., and co-inventors of the process which is being tried out experimentally at the Shevelin-Hixon Co. mill at Bend, Ore.

The process depends upon the ability of a water-miscible solvent, such as acetone, to extract water from the lumber.

The lumber is stacked and bound in packages which are stood endwise in the extracting tank, which in the pilot plant measures 8 x 5 x 16 feet and holds 3200 board feet of lumber.

Once in the extractor, the lumber is sprayed with solvent at the rate of 100 gallons per minute. The spent solvent, together with water and organic extractives, goes to a reboiler, which sends part of the solvent back to the extractor and part to a still. The still separates the solvent from water and pitch, which are recovered as a partial emulsion. The organic materials, which are predominantly fatty acids in sap wood and predominantly resins in heart wood, rise to the top and are decanted. Turpentine and neutral fats are other by-products.

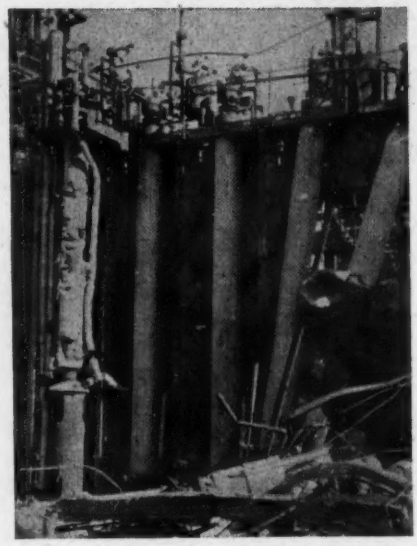
The lumber is then treated with superheated steam, which brings the acetone content down to about 0.2 per cent of the weight of the wood. Drying to 3 per cent water is possible, but commercially, 8-13 per cent is practical.

In addition to the saving in time, other advantages cited are lighter color, less warping, and easier painting of knotty wood because the pitch is removed.

Alcohols Above C_3 Produced From Olefins, CO and Hydrogen

EDITORIAL STAFF REPORT

STILL ANOTHER METHOD FOR THE SYNTHESIS OF ALCOHOL ABOVE C_3 is provided by the so-called Oxo process. Here synthesis gas is first reacted with an olefin or a mixture of olefinic hydrocarbons to produce a mixture of aldehydes and alcohols. This mixture is then hydrogenated in a second step to produce the crude alcohols, which can be separated by various physical or chemical means. A most interesting future is ahead for this process in the U. S. because of the availability of the raw materials required and demand for its products.



Courtesy Bureau of Mines

Remains of Oxo converters in Germany.

THE Oxo process consists of the formation of primary alcohols by the interaction of olefinic hydrocarbons, carbon monoxide and hydrogen over a Fischer-Tropsch catalyst. For example, ethylene gives n-propanol; propylene gives n-butanol. The wide range of olefinic hydrocarbons available from the American petroleum industry should allow the production and sale of many primary alcohols which were hitherto relatively expensive or unavailable on a commercial scale. At least one of the major oil companies has been reported to be carrying on the development of this process.

Although the reaction was first developed by the Germans, the first work appears to have been carried out by the Bureau of Mines at Pittsburgh.[1] These studies were published in 1930 and were initiated to add to the existing knowledge of the mechanism of the Fischer-Tropsch reaction. However, it was left to the German economy to begin the commercialization of the process, starting about 1938.

PRODUCT

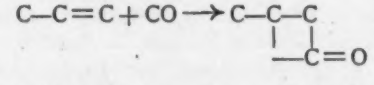
Primary alcohols are the principal product of the reaction, though aldehyde polymers, hydrocarbons and the corresponding aldehydes are produced in very appreciable quantities. It is of interest that the descriptions of the process emanating from Germany since the War fail to mention the production of ketones, which are listed as an important by-product in the Roelen patent[2] which covers this process.

The aldehyde polymers comprise about 20% of the crude product. Most of the alcohols are produced by a secondary hydrogenation step following the first reactor, but about one-third of the aldehydes formed are hydrogenated to alcohols in the first reactors. If aldehydes are desired, it has been found preferable to hydrogenate the aldehyde formed in the first step of the process to alcohols, separate the alcohols and oxidize them to the corresponding aldehydes, rather than attempt to isolate them from the reaction mixture issuing from the first reactors.

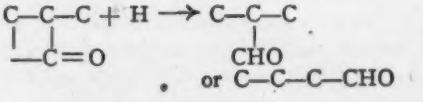
About 50% of the aldehyde polymers formed in the first reactors are broken down to alcohols by the second hydrogenation step.

REACTION

The first step in the process[3] consists of the addition of carbon monoxide to the double bond of the olefin:

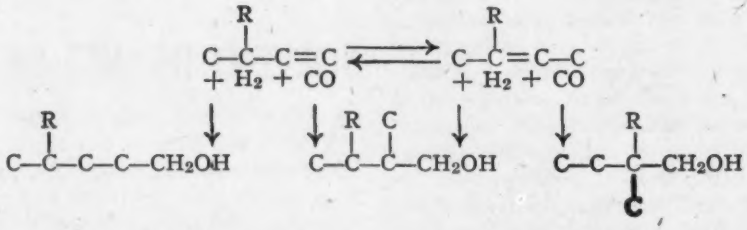


This intermediate product cannot be isolated because of its immediate hydrogenation to the aldehyde, the exact position of the aldehyde group depending on the point that the hydrogen enters the molecule:



Further hydrogenation, principally in a second stage, yields the alcohol.

Even in the simplest case a mixture of alcohols and aldehydes is produced, the tendency toward a mixed product being increased by the isomerization of the olefin under the reaction conditions:



The reaction involving the least steric hindrance predominates. For example, when isobutylene is the olefinic raw material, the production of 3-methyl butanol predominates over that of 2.2-dimethyl propanol.

THE PROCESS

The mixture of olefins, carbon monoxide and hydrogen are contacted in two separate reaction steps. Before entering the first of the tubular reactors the synthesis gas (carbon monoxide plus hydrogen) and the olefin feed are preheated to about 150° C. The synthesis gas used is

partly recycle gas from the process plus the makeup gas which consists of approximately equal proportions of CO and hydrogen. The temperature of the product issuing from this reactor is controlled at 150° C.

The second reaction step consists of the two-stage hydrogenation of the crude alcohol-aldehyde mixture to alcohols. As this step is hindered by the presence of carbon monoxide, it is necessary to release the crude product from the first step to atmospheric pressure before the beginning of the hydrogenation, which is carried on at about 200 atmospheres and 170-195° C. The same catalyst can be used in both stages or it can be filtered off and replaced by copper chromite after the first stage.

The top of the second hydrogenation reaction vessel serves as a separator for the hydrogen and the liquid products. The off-gas from the second hydrogenation vessel is water cooled and after a further condensation of the liquid content is passed at 250° C. over an iron catalyst in order to convert the carbon monoxide content to methane for CO removal.

The liquid product is let down to a pressure of 10 atmospheres through a separator in which the dissolved gases are vented. It is then passed to a filter for catalyst removal. The catalyst is recycled by backwashing the filter with the olefin feed.

CATALYST

The usual cobalt-thoria Fischer-Tropsch catalyst is used. Its approximate composition is:

30% Cobalt
2% Thorium Oxide
2% Magnesium Oxide
66% Kiesleguhr

During the later runs by the Germans the scarcity of cobalt caused a reduction of the cobalt content of the catalyst to about 25%. This reduction was reported to have had little effect on the reaction.

A catalyst concentration of about 3-5% by weight is used in the olefin feed entering the first converter, most of the catalyst being recycled. The time to reaction is of the order of 20 minutes when Kogasin, the Fischer-Tropsch reaction product, is used as the feed. The lower olefins require a shorter time of contact. Low concentrations of olefins in the feed necessitate the use of a longer contact time and higher temperatures in order to insure completion of the reaction. Normally about 70% of the olefins charged are converted in the first reactor, approximately 80% of the olefins reacted being eventually recovered as alcohol.

TREATMENT OF PRODUCT

The type of olefinic raw material used determines the treatment of the filtered crude product. Suitable separation can be achieved by simple distillation if the boiling range of the raw material is not more than 30° C. The boric acid method must be used if a raw material with a wider boiling range is employed.

For material with a wider boiling range the crude product is separated into cuts with a 50-60° C. boiling range. The product is esterified with boric acid at atmospheric pressure and 95-120° C. The water formed and the lower boiling hydrocarbons are continuously removed as overhead. The secret of the esterification process is stated to be the complete removal of the water of reaction as it is formed.

The residual mixture and hydrocarbons are then distilled at atmospheric pressure, or under vacuum if necessary to avoid ester decomposition which starts at about 300° C. The separation of alcohols and hydrocarbons is simple as the esterification increases the boiling point of the alcohol about 120° C. above the rest of the cut.

The separated esters are mixed with recycle dilute boric acid solution and hydrolyzed by heating to 95-120° C. The hot mixture of alcohols and 16-17% boric acid solution separate into two layers, the upper alcohol layer being washed with water and redistilled. The boric acid is crystallized and recirculated.

The mixed alcohols obtained by the Germans were usually sulphonated for detergent manufacture. It has been stated that for this purpose the mixed alcohols are better than the pure compounds.

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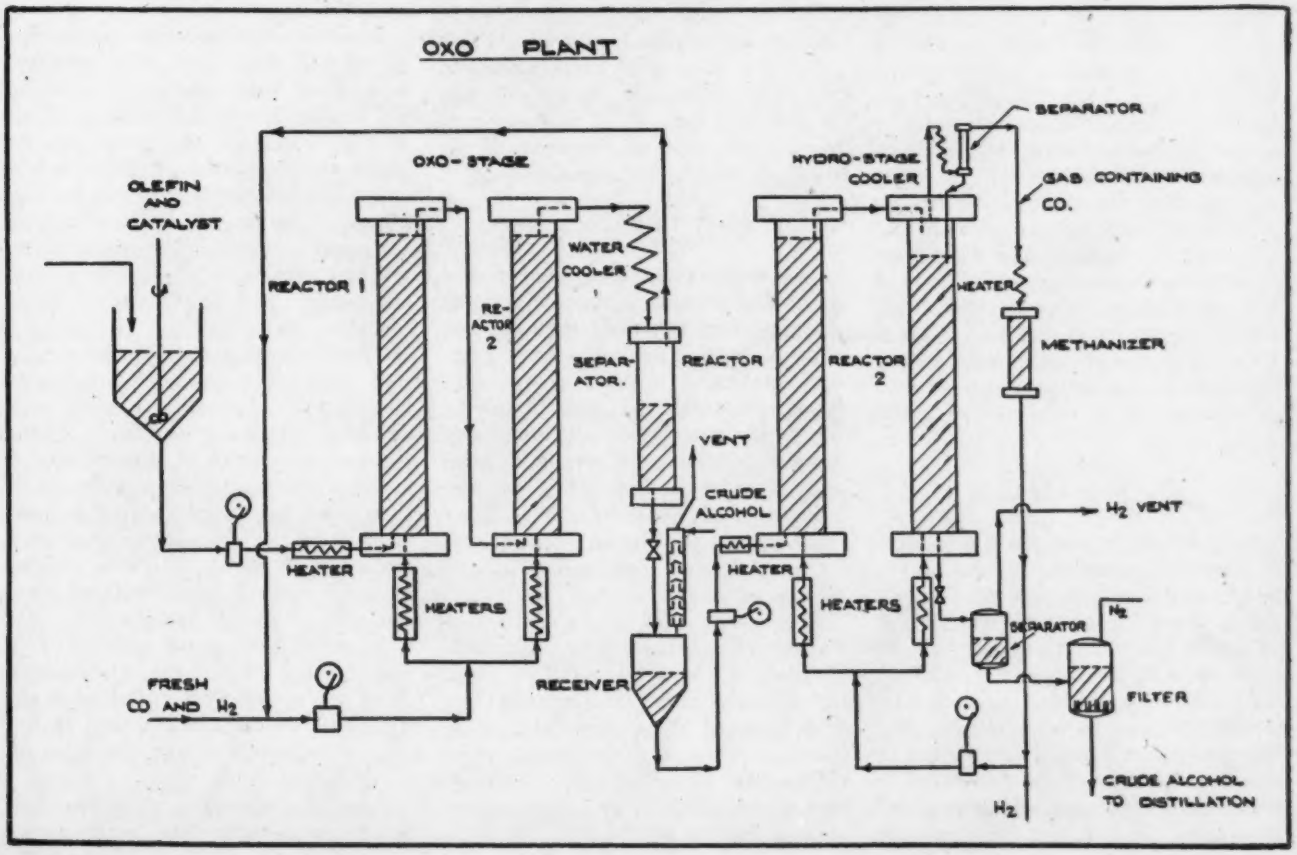
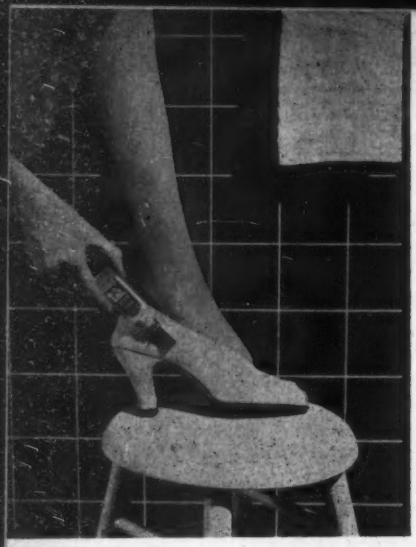




Formulation of WHITE SHOE CLEANERS

by PAT MACALUSO
Foster D. Snell Inc., New York, N. Y.

WITH MORE AND MORE WHITE LEATHERS coming on the market many specialty companies are contemplating the manufacture of white shoe dressings. Very little equipment is required and formulations are basically simple. However, there are many important factors to be considered in the compounding of a competitively satisfactory product.

WHITE SHOE cleaners and white shoe polishes are neither cleaners nor polishes in the accepted sense of these words. They are really a special form of water paint and are best called white shoe dressings, or more simply, shoe whites. They function by covering the shoe with a strong white pigment of good hiding power.

Shoe whites have always been a popular specialty, and occupy a rather unique position in the public consciousness. This is due to a number of factors. Few, if any, articles of clothing soil as readily and as rapidly as a white shoe; and the satisfactory application of the white to a shoe is a fairly exacting job. So consumers often develop marked preferences and prejudices toward particular brands. Poor odor, caked pigment, or easy rubbing off of the shoe dressing all militate against consumer acceptance. The ideal shoe white has yet to be formulated, but there are standards of performance which have been set and which any serious newcomer or existing product must meet or exceed if it is to succeed competitively.

HOW THEY ARE MADE

Shoe whites are composed essentially of a white pigment in an aqueous vehicle containing a film-forming binder, and a dispersing agent to stabilize the suspension. The most popular form of shoe white is the liquid, and although there are several makers of white shoe creams which are packaged in tubes, this type of product has not acquired more than a minor share of the market.

Manufacture of these whites is basically simple, not even heat being required for their production. Usually the dispersing agent, binder, and any other water-soluble raw materials are dissolved in batch kettles. The pigment is then sifted into this solution and uniformly dispersed by means of high speed agitation. In some cases the pigment is first wet with a small amount of alcohol to aid dispersion. A colloid mill is sometimes used, too, but is not regarded as essential to the production of a satisfactory product. When casein is to be added it is first allowed to swell and then dissolved in water which has been rendered alkaline with ammonia, borax, soda ash, or some such material. This concentrate can then be stirred into water containing a wetting or dispersing agent.

WHAT THEY CONTAIN

Composition-wise the key ingredient of white shoe dressing is the white hiding pigment which is present to the extent of about 10 to 20 per cent. A few years ago commercial products always contained lithopone, and very frequently zinc sulfide, precipitated chalk, or ordinary white clay whiting. Currently titanium oxide is by far the most widely used pigment, although practically every other white pigment can also be found in present formulations—used mainly as an extender or modifier.

The importance of proper selection of the pigment cannot be over-emphasized. Shoe whites paint the shoe. They cover soil and stains rather than cleaning them from the shoe. Several types of titanium oxide can be employed—such as anatase, rutile, water dispersible, etc. They all vary in their hiding power, ease of dispersion, stability against light discoloration, and caking characteristics. They are not interchangeable, therefore, and must each be formulated separately.

The vehicle consists mostly of water, with a small amount of binder which ranges from 10 to 25 per cent of the pigment content. The chief function of the film-forming binder is to keep the white pigment on the shoe in a uniform film and reduce rub-off or dusting to a minimum. It must do this without matting the nap on suede type leathers.

An auxiliary function of the binder may be to keep the pigment in suspension in the non-separating type of shoe white, and to impart a desired consistency to the liquid. The binder also has a major influence on the leveling and the ease of application to the shoe white, even though special leveling agents are sometimes used.

In addition, the binder determines ease of removal of the shoe white by water, or soap and water. Avoidance of caking and of chemical decomposition with time are also important considerations in the choice and formulation of the binder. A combination of two binders is often employed. They are usually chosen from the group of materials comprising soaps, synthetic surface-active agents, natural and synthetic gums, and water soluble or solubilized proteins.

Other ingredients usually present in shoe whites are a leather softener, a leveling agent, a cover odor, and a preservative. The leather softener is a fatty substance of animal or vegetable origin (such as neatsfoot oil or lanolin) added in a small percentage for the purpose of replacing oils which are removed from the leather by the shoe dressing. These oils help prolong the life of the shoe leather and minimize cracking.

A leveling agent is not necessary with some binders. The choice of a leveling agent where needed depends so much on the nature of the binder that it is not possible to generalize as to the types of materials used.

Cover odor practices vary widely, too. Some manufacturers use perfume-type

odors, while others employ odors similar to those used in regular wax-type paste polishes.

The choice of the preservative depends to some extent on the nature of the binder and its effect on the odor of the shoe white. The chlorinated phenols and esters of para-hydroxybenzoic acid are among the more popular. Formaldehyde also finds a place in some formulations.

The following formulas indicate the approximate composition of several commercial products:

1.	Sulfated fatty alcohol	— 1 per cent
	Dextrin	— 1
	Disodium phosphate	— 0.2
	Titanium oxide	— 18
	Water	— 79.8
2.	Methyl cellulose	— 5 per cent
	Sulfonated oil	— 2
	Titanium oxide	— 13
	Talc	— 3
	Clay	— 1
	Water	— 76
3.	Sulfonated oil	— 4
	Sodium borate	— 2
	Boric acid	— 2
	Casein	— 0.5
	Titanium oxide	— 13
	Water	— 78.5

WHAT THEY MUST DO

Although, as has been noted, the actual composition of white shoe dressings is quite simple, the formulation of a satisfactory product entails many considerations. In no field is the consumer more critical of quality, and in few are there so many pitfalls awaiting the unwary.

Intelligent formulation can only be based on a thorough understanding of the essential requirements for good performance. Two requirements which often cause headaches to the manufacturer, but which are taken for granted by the dealer and consumer, are stability against spoilage and stability against caking. Spoilage, such as fermentation of carbohydrates or putrefaction of proteins, usually results from the use of improper or insufficient preservative agents. It may be evidenced by discoloration, growth, bad odor, or the development of pressure.

Caking may be of two main types, namely formation of a soft clot which does not readily redisperse on shaking, or formation of a relatively dense, hard cake. Caking may occur on shelf aging or as a result of vibration during long shipping hauls. A product which separates rapidly on standing does not necessarily cake or clot, but it does suffer from a sales standpoint. The best products of today aim at a happy medium in which the suspension is not necessarily thoroughly stabilized and some settling (but not caking) of the pigment occurs. Then the upper layer should not be water-clear but should remain milky. The appearance thus remains reasonably satisfactory although the bottle does require shaking prior to use.

The main points which impress the user of shoe whites are ease of application, whiteness on the shoe, and low rub-off or dusting of the pigment from the dressed shoe. These require proper consistency, so that the liquid can form a thin, smooth, coherent layer on the shoe; use of sufficient pigment of high covering or hiding power; and choice of an effective film-forming binder. Too high a concentration of casein or resin binders should not be used however, or they may have a cumulative water-proofing and stiffening effect, building up on the shoe and causing the leather or fabric to crack.

Less apparent considerations relate to the effect of repeated application of shoe white to the shoe leather. A good shoe white should be acid in the interest of maximum tannage stability. Mild soap alkalinity is often found in commercial products, and is acceptable, but the use of alkaline agents such as trisodium phosphate, is not favored. Naturally the shoe white should be free of strong grease solvents.

Other requirements are that the shoe white in the bottle should have as white an appearance as possible and should be free from discoloration or darkening by long exposure to light. The consistency should be preferably as high as good leveling on the shoe, and ease of pouring from the bottle, will permit. Too, the shoe white should not mat nappy type leathers and should take some gloss upon buffing on a smooth shoe. The dressing should not run too readily if wet or spattered with water, yet should be readily removable with a little soap and water.

In discussing the requirements of a good shoe white we have in effect defined the ideal product. It is apparent that a compromise is often necessary since a product which excels in one quality will for the same reason be poor in another. For example, a shoe white using the strongest possible white pigment may show more apparent rub-off than a less effective product, even though the actual amount of pigment dusted off may be less than with the weaker shoe white. Likewise the achievement of complete non-separation of a shoe white greatly complicates the question of consistency and its stability with age.

IMPORTANT CONSIDERATIONS

It is clear that the manufacturer who contemplates improving his present shoe dressing, or plans to add a shoe white to his line, must plan well in advance. Shoe whites are sufficiently complex in their behavior so that each new formulation, and even apparently minor modifications of an established formula, must be considered carefully.

The fact that shoe whites are often held over on the shelf from one season to the next points up the advisability of determining aging behavior. In the case of white shoe creams aging tests are necessary to ensure against corrosion of tubes, discoloration of the cream, and changes in consistency such as stiffening, thinning, or separation of liquid.

Accelerated tests including aging at elevated temperatures, freezing tests, determination of the effects of incubation, and the stability of the product under vibration, and exposure to light, also provide important data.

Shoe dressings, in cream form, are packaged in jars and tubes. Their sale is not as extensive as liquid products. Main formulation difference: more soap and less water.

PROSPECTS

As mentioned, the ideal shoe white has yet to appear on the market. However, improvements are being made continually, and several superior products are now nearing the production stage. It can be expected, now that the war is over and free competition is coming into its own again, that advances in the production of superior pigments and new binders, coupled with the development of a better understanding of the care and treatment of leathers, will be reflected in white shoe dressings.

Carboxymethyl Cellulose Now Produced in U.S.

EDITORIAL STAFF REPORT

ALTHOUGH SODIUM CARBOXYMETHYL CELLULOSE has been used in Europe for some years as a thickening agent and detergent assistant, plant-scale manufacture in this country was announced only late last year. Potential uses for this water-soluble gum-like cellulosic substance are manifold.

PLANT-SCALE production of sodium carboxymethyl cellulose was started November 15 by Hercules Powder Co. at its Hopewell, Virginia plant after two years of pilot-plant production and development. The commercial plant of Standard Chemical Co. Ltd., in Toronto, came into operation in the early part of January. The Sylvania Division of American Viscose Corp. is manufacturing the material in a fairly large pilot plant, but their product is sold under contract to one or two customers and is not offered for general sale. Dow Chemical Co. is also believed to be planning large-scale production.

This widespread interest in CMC, as the material is called for short, is not a flash in the pan, for this is a material of protean properties and illimitable uses.

INCREASES VISCOSITY

The important property of CMC which is the basis of most of its uses is its ability to increase the viscosity of mixtures to which it is added. At room temperature water has a viscosity of slightly less than 1 centipoise. A 1 per cent solution of high-viscosity CMC at the same temperature (25°C.) has a viscosity approximately 2000 times as great. Aqueous solutions of CMC, either hot or cold, can be prepared in a wide range of viscosities, and the material thereby finds use as a thickening agent in textile printing pastes, latex dispersions, embalming fluids, and other applications where viscosity regulation is important.

As a stabilizer for emulsions and suspensions, CMC is useful in lotions, creams and other cosmetics, tooth pastes, and in many types of oil-in-water emulsions. In emulsion paints and lacquers its film-forming properties also come into play, as they also do in grease-proofing paperboard and sizing paper and textiles.

CMC is also applicable as a binder and vehicle in crayons and leather pasting, and its colloid properties give it important stature in latex creaming, ceramic glazing, can-sealing compounds and insecticide formulations. A special use of potential importance is in the formulation of oil drilling muds.

Chemically, CMC is a carboxylic acid bound to cellulose by an ether linkage. In one respect—that it is the sodium salt of a weak, water-insoluble acid—it is like soap, and, like soap, a precipitate is formed by the addition of acids or heavy metal salts to its solutions. This property may suggest uses where a water-insoluble film is desired.

Because the basic material is a carbohydrate, films of CMC are insoluble in all of the common organic solvents, such as acetone, benzene, ether, carbon tetrachloride, mineral oil, or peanut oil.

The ratio of carboxymethyl units to anhydro glucose ($C_6H_{10}O_5$) units can be varied at will. In Hercules' product the ratio is 0.75; in the German materials the ratio is varied from 0.5 to more than 1, depending upon the end use of the material. In fine, the properties of CMC are those of a water-soluble cellulose gum whose properties can be modified by the extent to which carboxymethylation is carried out.

PRODUCTION

None of the American producers has revealed the process of manufacture, but German methods, to which American practice is believed to be quite similar, have been thoroughly investigated and described.[1]

Sodium carboxymethyl cellulose was made at 5 plants in Germany. The largest were the I. G. Farben plant at Kalle, which produced 750 tons per month, and The Henkel & Cie. plant at Düsseldorf, whose capacity was only slightly less. The I. G. plant at Elberfeld made only 50 tons per month, and the Sichel and Gebr. Haake plants, at Hannover and Dresden, respectively, manufactured only small amounts. Total monthly production was probably in the range of 1500 tons. At least some of the production is being continued.

At Kalle the raw material is beech or fir sulfite pulp of 86-88 per cent alpha cellulose, which is received in sheets of 24 x 32 inches. These are stacked in steel cradles and lowered into lead-lined tanks containing 18 per cent caustic soda. After 2 hours at room temperature they are drained and pressed to 1.7 times their dry weight by a hydraulic ram exerting 5800 p.s.i.

The alkali cellulose is shredded in a mild steel Werner-Pfleiderer macerator, whereafter the product is dumped to a Werner-Pfleiderer attrition mill on the floor below. At this point the material is a moist, fluffy mass.

This is carried to a Voith tabletter, which is a large, grooved, revolving drum, rotating on a horizontal axis. The moist material is fed into the groove when the drum is at the top of its revolution, and at the bottom it is compressed and shot out as cylindrical tablets about 6" long and 3" in diameter. These are carried up four floors in a steel pneumatic tube and broken up for storage.

REACTION

The alkali cellulose lumps are weighed into carts and dumped through a manhole into Werner-Pfleiderer steel kneaders of about 2000 gallons capacity on the floor below. These are equipped with water jackets and saw tooth sigma blades, are bottom discharging, and are operated by 120 HP motors.

The kneaders are charged with about 1300 lbs. dry weight of the starting pulp and 0.56 times as much sodium chloroacetate. Agitation is started and the reaction is allowed to proceed at 40° C. for 2 hours, after which time reaction is 60 per cent complete.

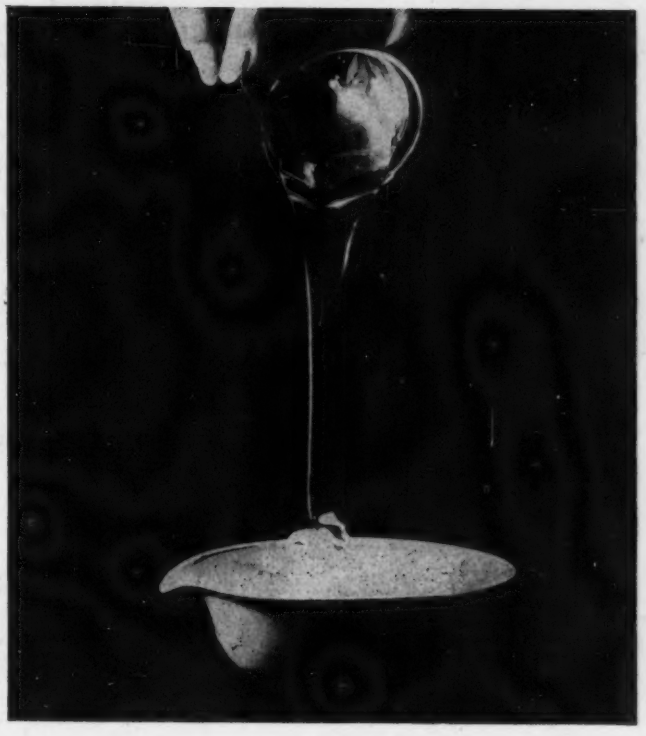
The product is then dropped into finishing drums on the floor below for completion of the reaction. These are about 11½" in diameter and 5" long, rotating on horizontal axes. The reason for the shift is that these drums are less expensive equipment, and thus the more costly reactors are not tied up as long with each batch. Here the product is tumbled for 3-5 hours, the drums revolving at 7½ rpm. The temperature is held below 40° C. by water jackets.

At this point the product has the following analysis:

35-37 per cent water
30-33 per cent CMC
Remainder, sodium chloride, sodium glycolate and sodium carbonate (from sodium bicarbonate added to react with excess caustic).

The material is dumped through the floor to a receiver and screw conveyed to an Eirich mill, which has parallel vertical disks with teeth on the faces. Some of the disks are stationary and some are revolving, tearing the product into a

[1] DeBell, Goggin and Gloor, "German Plastics Practice," publ. by DeBell and Richardson, Springfield, Mass., 1946; chap. IX.



The high viscosity of sodium carboxymethyl cellulose solutions is shown graphically in this series of photographs—top left, top right and bottom right, respectively. This property makes CMC useful wherever control of viscosity in industrial operations is desired.

moist, fluffy mass. This is thrown into a small cyclone and dust collector, and the final product is again pelleted in a Voith tabletter. The pellets are carried by a polyvinyl chloride pneumatic tube to a receiving bin, where it is broken up for packaging. Use of PVC instead of steel reduces clogging of the tube due to moisture condensation.

SOME OF IT PURIFIED

For some uses a salt-free product is desired. The crude product is then washed with methyl alcohol, to which a little water has been added, until the extract contains only a trace of salt. The alcohol is removed by heating the product in a 1300-gallon steam-jacketed tank equipped with an agitator. The alcohol is condensed and the product dried.

The final product contains 0.5-0.6 glycolic residues per anhydro-glucose unit and appears more fibrous than American materials.

ELBERFELD PROCESS DIFFERS

At Elberfeld nitric pulp is used. There 286 lbs. of pulp, 356 lbs. of chloroacetic acid and 598 lbs. of 50 per cent caustic are added to a kneader and allowed to react exothermically, reaching a temperature of 70° C. The reaction mixture is adjusted to neutrality by addition of acid or caustic over a 2-day period, whereafter it is discharged to roll driers. This product, containing 2 parts of water and 1 part each of CMC and salts, is shipped to Leverkusen for further processing. The ratio of glycolic residues to glucose units here is over 1.

The impure material is used in Germany as an extender and assistant with synthetic detergents for laundering. Less soluble batches are used as starch substitutes in textile sizing. Its cost is about 0.9 mark per kilogram.

The purified material, costing 4 marks per kilogram, is used as a thickening agent in food preparations, as a pectin substitute in jellies, and as a pharmaceutical thickener replacing acacia and gum tragacanth. For these purposes it is obvious that the material must be methanol-free.

The Elberfeld material, costing 2-3 marks per kilogram, is used in the textile industry as sizing and as a thickener in color printing.

AMERICAN PROCESS

No process information has been revealed by American producers. Hercules has announced, however, that CMC is being produced in a two-story reinforced concrete tile building with stainless steel equipment. Among the equipment are listed centrifuges and a solvent recovery unit, indicating that they may use the methanol process for rendering the CMC salt-free. Centrifuges may be used for drying rather than, or in addition to, pressure.

The domestic product is now selling for 70-80c per pound. Judging from the price history of other cellulosic derivatives—

Ethyl cellulose	$1.50 down to	$0.50
Cellulose acetate	1.00 down to	0.35
Cellulose nitrate	1.00 down to	0.70

—one should expect fairly sizeable price reductions over the next few years.

Aerosol Technique Provides Plant-Scale INSECT CONTROL

by E. C. BARNES,[1] W. T. GALEY,[2] JOHN H. FALES,[3]
L. S. HENDERSON,[3] and W. R. RINELLI[4]

INSECTICIDAL AEROSOLS HAVE ATTAINED prominence in recent years as a means of exterminating flying pests in the household, but the possibility that they might be employed to effect similar control in large buildings, such as factories, had not been investigated before the work described here was undertaken. The satisfactory results obtained by the use of the technique developed by the authors may well lead to broader utilization of aerosols in food processing plants, laundries, and other factories.

SHORTLY after the construction of a plant located along the Delaware River near Philadelphia, a very definite production problem arose because of the excessive number of mosquitoes in this area.

There were approximately 3,000 employees in the factory, with half of them on the second and third shifts. At one time there was an actual loss of production in one day of 1,100 man-hours representing $1,815 in wages. On days when the mosquito problem was at a minimum, the loss stood at 20 man-hours, or $33.00 in wages. Furthermore, throughout the summer months a marked deterioration in morale among the employees was evident.

The two conditions cited represented the maximum daily loss and the minimum estimated loss; the average was somewhere between these limits. Thus, it was clearly indicated that a reasonable return on a mosquito control project could be realized.

NATURE OF THE PROBLEM

The area surrounding the plant is swampy and contains several creeks and rivers. A survey in the summer of 1943 by entomologists of the U. S. Department of Agriculture indicated that it would be impractical for either the government or industrial firms to spend the money and manpower that would be necessary to appreciably reduce the mosquitoes by breeding control.

The plant under consideration consists of one large building of modern construction approximately 1,300 feet long and 400 feet wide (about 11 acres), with a roof height varying from 44 to 64 feet. The estimated internal volume of the building is 27,700,000 cubic feet. This is roughly comparable to 1,700 six-room houses—the number required to shelter a town of approximately 6,000 persons.

It was apparent from the nature of this problem that the ordinary methods of mosquito control were impractical and not applicable. The use of screens on windows and doors would have been very expensive and of questionable value due to the size of doors and traffic through them. However, the development of liquefied gas type of aerosol for mosquito control in enclosed spaces had been reported,[1] and led to the belief that there was no limit to the size of the enclosed space that could be successfully fumigated if the proper equipment or means for distribution was available. It was decided, therefore, to develop a method of applying aerosol for this mammoth building.

An aerosol, as related to insect control, refers to a colloidal suspension in air[2] of very small particles of insecticide. It is produced by releasing—through a suitable capillary or nozzle—a solution of the insecticide in a solvent of relatively high vapor pressure (low boiling point). The vapor pressure of the solvent is sufficient to expel the insecticide solution through the nozzle or capillary. This solvent is usually called the propellant solvent. Upon its release into the air, the propellant solvent evaporates violently, thus breaking up the dissolved insecticide into minute particles which momentarily appear as a fog. Due to the minuteness of these particles they ride the natural air currents and remain suspended in the air for a period of time.

HOW EQUIPMENT WAS SELECTED

Numerous different methods of dispersing the aerosol were evaluated. When an aerosol is released from a capillary tube, it travels only a few feet, due to its own initial velocity, and then diffuses or mixes with the surrounding air. It was recognized that the concentration of either the propellant gas or the insecticide, at the point of delivery, had to be limited. This could be accomplished by releasing the aerosol into an air stream from some type of fan or blower, with a resulting two-stage diffusion. The aerosol would diffuse first into the main air stream from the blower, and as this velocity fell to zero a secondary diffusion into the surrounding air would ensue.

This basic two-stage diffusion could be accomplished in various ways. For example, a manually transported cylinder equipped with an aerosol nozzle could be held in front of ventilating or unit heater fans and the aerosol discharged into the air stream. This could be repeated at enough locations to treat a given area.

In larger areas a fixed pipe line of small size could be installed with the proper number of nozzles in front of each blower or unit heater. In another plan, the cylinders, nozzles, and fan could be mounted on overhead cranes which would traverse the area and discharge the aerosol.

After weighing the advantages of various methods, it was decided that the aerosol-dispersing equipment should be mounted on a two-wheeled trailer. This trailer could then be drawn up and down each shop aisle at a constant speed, the aerosol being dispersed vertically with sufficient force to send it to the top of the building. It would then mix with the air of the aisle where it was released, gradually diffusing into adjacent aisles and throughout the building. This assured a controlled dosage of insecticide, good distribution, and the advantage of the two-stage diffusion principle.

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A number of different insecticides were given consideration, although it was apparent that several of the available materials presented serious problems with regard to the quantity of insecticide that might be needed, flammability, killing time, discomfort or health hazard to employees, and adaptability to the aerosol method of application.

Since this was apparently the first time anyone had attempted to control mosquitoes in a building of this size and under these conditions, an experimental project using the DDT aerosol was authorized under the supervision of the Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, U.S. D.A. A small quantity of DDT was made available for this investigative work. Pyrethrum was not then obtainable.

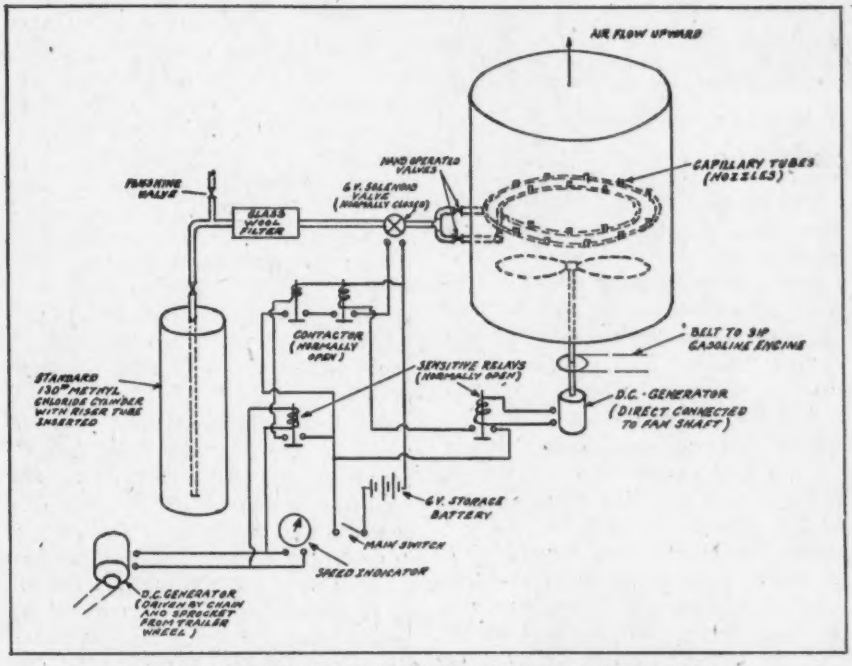


FIG. 1 SCHEMATIC DIAGRAM OF AEROSOL DISPERSING EQUIPMENT

All of the different factors, such as concentration of the aerosol that would be required in the air, the length of time that exposure would be necessary, toxicity to inhabitants of the building, effect on the building and machinery, and the method of distribution, were fully considered and a suitable apparatus designed for the dispersion of the aerosol. Various factors relating to the propellant solvent for the insecticide had to be evaluated. Freon was unobtainable at this time, and after careful consideration methyl chloride was selected. Factors influencing this decision were its availability; a good solvency for DDT; suitable vapor pressure; narrow explosive range[3]; and low toxicity to humans.

EQUIPMENT DESIGN

The aerosol-producing system is shown diagrammatically in Figure 1. The cylinder containing aerosol solution was equipped with a riser tube extended to the bottom of the cylinder and permitted the flow of liquid, not gas. The connection from the cylinder valve was made with ⅜ inch copper tubing to a T which could be opened to flush the system. Following the T were a glass wool filter, a magnetic shut-off valve (normally closed), and a Y connection. The two ⅛ inch iron pipe rings which contained the threaded outlets for attaching the capillary nozzles were connected into the Y. The capillaries were made of stainless steel tubing and were brazed into threaded brass plugs. They were one inch in length.

Two concentric rings containing the capillary nozzles were provided, so that by merely opening or closing a valve two different predetermined rates of discharge could be used in the two different sections of the building having different roof heights. This was done in preference to reducing the flow through one set of nozzles, to avoid a change of particle size in the aerosol. The two rings were made of ⅛ inch standard iron pipe having diameters of 12 and 24 inches. The small ring had 12 standard ⅛ inch couplings while the large ring had 20 such couplings.

All of the different sized capillaries were soldered into brass plugs, which screwed into the couplings. The rings were mounted in a vertical metal cylinder 32 inches in diameter and 60 inches high with the top and bottom open.

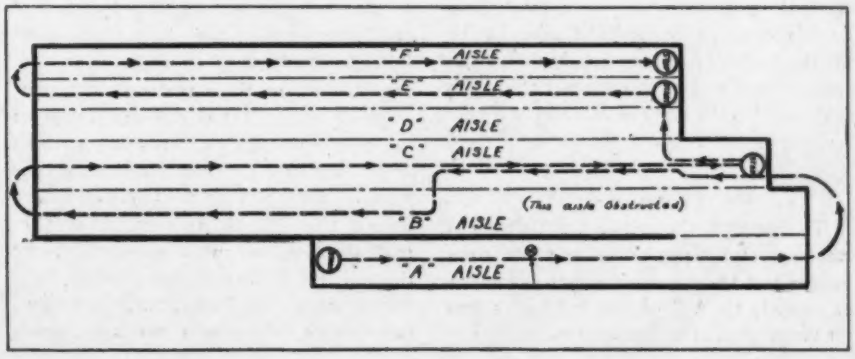
At the bottom of this cylinder a 30 inch propeller type axial flow fan was mounted to discharge upward through the cylinder. The capillary nozzles were placed 18 inches above the fan, the upper portion of the cylinder being used to stralghten the air flow from the fan. The upward discharge of the fan was approximately 15,000 c.f.m. and gave a velocity of approximately 250 feet per minute 40 feet above floor level.

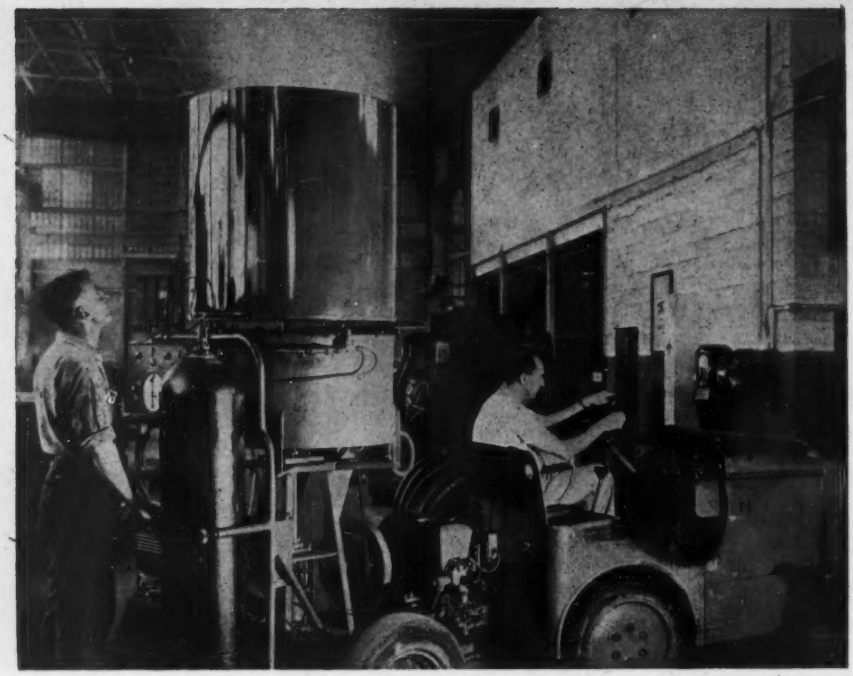
The solenoid valve in the pipe line was inter-connected with electrical interlocks, as shown in Figure 1, so that the aerosol would automatically be shut off in case the fan speed or truck speed was reduced below normal. This control was desirable to prevent over-dosage of any area and to avoid the possibility of forming an explosive mixture of the gas at any location where the truck might stop without the operator shutting off the flow of aerosol.

The aerosol solution was prepared in standard methyl chloride cylinders of various sizes depending upon the quantities of material needed for each test. Care was taken in mixing the ingredients to avoid moisture contamination which might cause ice formation during discharge through the capillaries, chemical breakdown of the solution, or rusting of the apparatus or container. The DDT was dissolved in cyclohexanone, the oil added, and the whole filtered through filter paper to eliminate foreign matter. This filtered mixture was drawn into a cylinder and methyl chloride added.

CORROSIVE ACTION

Technical data on DDT indicated that there might be a slight corrosive action on metals. The location of the plant on the water front involved high humidity in the atmosphere at all times, particularly during the night, and since industrial electrical controls are not moisture proof or totally enclosed, this corrosive action had to be investigated. Bright polished pieces of copper, brass, steel, iron, and stainless steel were dusted with powdered DDT and sprayed directly with the aerosol.





Special mobile equipment had to be designed for large-scale aerosol distribution.

After normal exposure for three and four month periods to shop atmosphere, no abnormal corrosion was found. Subsequent operation of the aerosol disperser for three summers confirms this conclusion, as no abnormal corrosion has been evident.

OPERATION OF EQUIPMENT

A plan view of the plant layout is shown in Figure 2. The plant offices, maintenance department and storerooms are located in aisle D and these consist in the main part of separate two-story structures inside the main building.

To get adequate and uniform distribution of the aerosol throughout this large structure the aerosol dispersing equipment was pulled up and down the aisles as shown by the lines and arrows in Figure 2. The truck speed was maintained uniformly at three miles per hour in all tests, and the rate of aerosol dispersion was predetermined so that the proper aerosol concentration would be produced in each aisle and uniformly throughout the entire building.

All doors and windows were closed and roof ventilators were turned off at the start of each test. Unit heaters are mounted on the building columns, and the fans in these units were run throughout each test to recirculate and mix the air in the building. At predetermined intervals after the start of each test the doors and windows were opened and the roof ventilators turned on.

RESEARCH PROCEDURE

To determine the overall effectiveness of the aerosol distribution in the plant, some means had to be worked out to determine accurately the kill of insects. Indications of the control of the natural infestation of mosquitoes was gained from the collection of insects knocked down during the tests. A more accurate study was made by distributing at predetermined locations a number of cages into which laboratory-reared mosquitoes or houseflies had been placed. The houseflies are more resistant to the action of DDT, and this permitted comparative studies where there was 100% kill on mosquitoes.

In all four tests, cages were placed in the vicinity of Column 43 in the A aisle, (see Figure 2,) and this location was considered the main test station. Various intervals of exposure were obtained either by placing cages at the desired location prior to the start of the experiment and removing them at different time intervals after the aerosol had been dispersed, or by bringing the cages into the building at a specified time after the dispersion of the aerosol and then removing them at a predetermined time. All cages which were brought into or removed from the building after the dispersion of the aerosol were handled in paper sacks to avoid contamination other than at the time intervals specified.

An index to the effectiveness of the aerosol under all different conditions was obtained by determining the percent knockdown of the caged insects at the end of the test period and the percent mortality in 16 hours.

To determine the actual concentrations of DDT and methyl chloride in the air of the building during each test, air samples were collected. To determine the concentration of DDT, samples were collected with a Mine Safety Appliances Co. electrostatic dust and fume sampler[4]. Since this device collects particulate matter from air efficiently, and does not collect gaseous constituents, there was no interference from methyl chloride in the collected samples. Analytical procedures were developed to determine both DDT and methyl chloride concentration.

A series of four tests was initiated, all carried through under closely controlled conditions. In the first of these the intended dosage was calculated on a basis of one pound of the aerosol per 150,000 cubic feet of building volume. This would have required 185 pounds of the aerosol solution and the average concentration of DDT would have been 5.3 milligrams per cubic meter of air, and a methyl chloride concentration of 44 parts per million. Due to some trouble with the capillary nozzles (0.017 in) the actual dispersion of aerosol amounted to only 113 pounds, resulting in an average concentration of 3.3 mgs. of DDT per cu. meter and 27 p.p.m. of methyl chloride. There was 100 per cent kill of all test flies and mosquitoes.

In Test 2, the percentage of DDT in the aerosol was reduced from 5 to 2.5 per cent, and SAE 30 lubricating oil was added to the solution. The size of the capillary nozzles was increased to 0.04 in. to eliminate plugging difficulties. Calculated average concentrations for this test were 1.6 mgs. of DDT and 27 p.p.m. of methyl chloride. Test cages were positioned at varying distances from the floor and were subjected to differing exposure times—from 2½ minutes to one hour. In 2½ minutes all mosquitoes were killed and 85 per cent of the flies were killed within 30 minutes.

For Test 3, the formula of the aerosol was the same as in Test 2, but only 86 pounds was dispersed in the building. The capillaries used were 0.03 in. inside diameter. A total of 16 of these was operated in the larger section of the building, 8 in the smaller. Equally satisfactory mortality curves were obtained, with special attention being paid to test cages at higher elevations. In Test 4, the aerosol dispersed was reduced to 54 pounds, using 0.015 in. capillaries.

SUMMARY OF TESTS

The entomological results of the four experiments are not directly comparable due to the presence of a number of variables. The most important of these were the quantity of aerosol dispersed, and its particle size as determined by the size of the capillary. There were also changes in the method of exposing the test insects in order to determine the effect of various conditions. It is important to note, however, that there was 100 per cent mortality of mosquitoes in all tests where they were exposed for the full exposure time. The first test, where 113 pounds of 5 per cent DDT aerosol were dispersed with 0.017 in. capillaries, produced complete mortality of all mosquitoes and houseflies.

It is evident from data compiled that the use of 0.015 in. capillary with the for-

(*Turn to page 339*)

THE CHEMICAL PANORAMA

NEWS OF THE CHEMICAL PROCESS INDUSTRIES IN PICTURES

Cyclotron Planners

Officials of Carnegie Institute of Technology study plans for a 200 million volt synchro-cyclotron and nuclear research laboratory. A grant of $300,000 has been received from the Buhl Foundation to help finance the $550,000 project.
Left to right: E. C. Creutz; Carl C. Monrad; Robt. E. Doherty; Webster N. Jones; R. F. Mehl, and J. C. Warner.

PEOPLE

ERNEST S. WILSON, advanced to the post of director of the engineering department, Hercules Powder Co. He succeeds Luke H. Sperry, who retired recently.

WILLIAM J. SPARKS, named director of the Chemical Division of Esso Laboratories, Standard Oil Development Co. Dr. Sparks did much of the original work on butyl rubber.

SEWALL D. ANDREWS, appointed vice-president of the Chemical Division of General Mills. He joined General Mills in 1930, and has held both purchasing and sales posts.

Perkin Medal

The synthesis of vitamin B_1 has won world-wide fame for Robert R. Williams, and last month four scientific societies gathered at the Hotel Commodore, New York to bestow the coveted Perkin Medal on Dr. Williams. Pictured at right are (left), Dr. Williams and Marston T. Bogert who made the presentation, before representatives of the Society of Chemical Industry, American Chemical Society, American Institute of Chemists, and the Electrochemical Society.
In his address, Dr. Williams outlined recent developments in vitamin research, and the opportunities presented for the future.

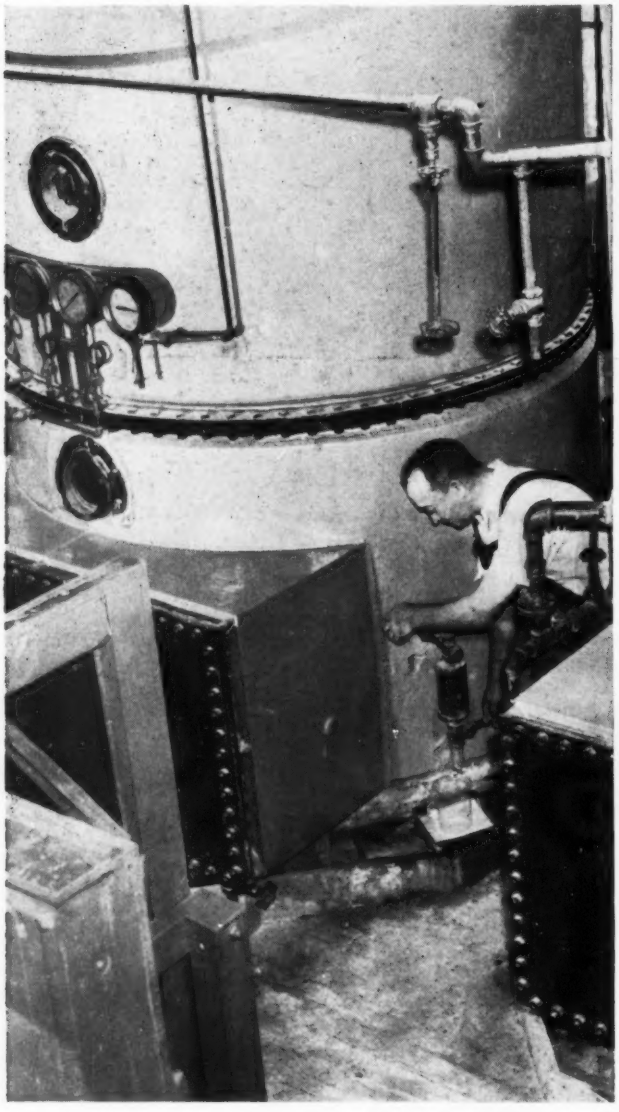
How Pentaerythritol Resins Are Made

Although pentaerythritol is a comparative newcomer to the chemical field, its tonnage output is now substantial and growing rapidly. During the war it was the basic raw material used for the manufacture of the high explosive pentaerythritol tetranitrate; now large quantities are being consumed for the production of resins.

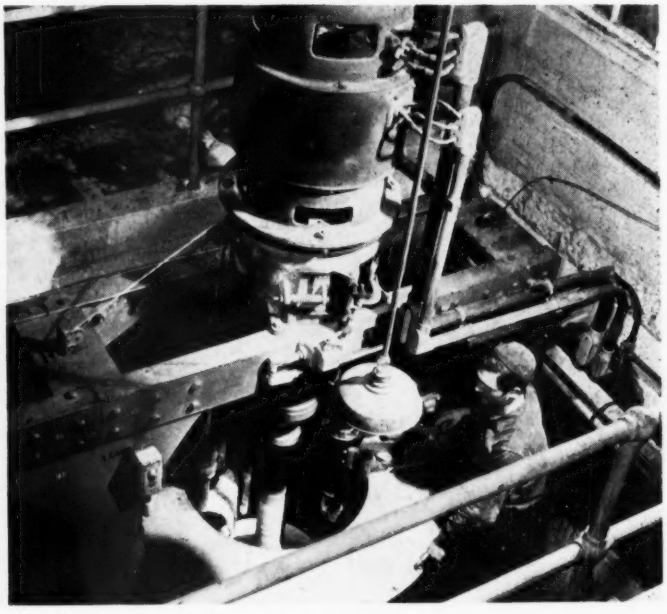
PE resembles sugar in that it is a colorless, crystalline solid of high melting point and a polyhydric alcohol. It is capable of forming alkyd resins with polybasic acids—such as phthalic, maleic, fumaric, adipic, etc. Thereby a wide range of unique resins can be formulated, useful particularly in varnish-making, printing inks, adhesives, and as modifiers for wax in polishing compounds. Combinations are possible too, of which rosin, maleic anhydride, and phenol-formaldehyde may be constituents.

One of the nation's largest PE and PE resin plants is located at Mansfield, Mass., owned and operated by Hercules Powder Co. The pictures on these pages outline the various stages in the production of both PE and Hercules "Pentalyn" resins at this project.

The pentaerythritol reaction is carried out in a large vat. The basic raw materials—formaldehyde and acetaldehyde—are piped from storage tanks. Lime is the catalyst.



The reaction mixture from the vat above is concentrated in a single-effect evaporator. This yields a comparatively crude product.



Material from the evaporator is transferred to the centrifuge shown. Thus the reaction liquor is removed from the pentaerythritol.

Refined and purified pentaerythritol is dried on tray driers. As produced it is colorless, crystalline and sugar-like in appearance.

Rosin charges are weighed in the melting room. After being melted it is piped to resin kettles. Other agents can be added to yield specific resins.

Weighed amounts of the drummed PE are emptied onto a conveyor which transports it to the resin reaction kettles.

After all raw materials are added to the kettle the batch is cooked, with stirring, until proper viscosity is reached.

The liquid resin is dropped through a pipe which conveys it to the cooling shed where it is run into drums, weighed, and cooled.

Resin control involves checking physical properties, such as drop melting point.

Laboratory is mainly devoted to resin technology. Operator runs Gardner-Holt viscosity.

Small scale polymerizations are carried out to determine the worth of new formulations.

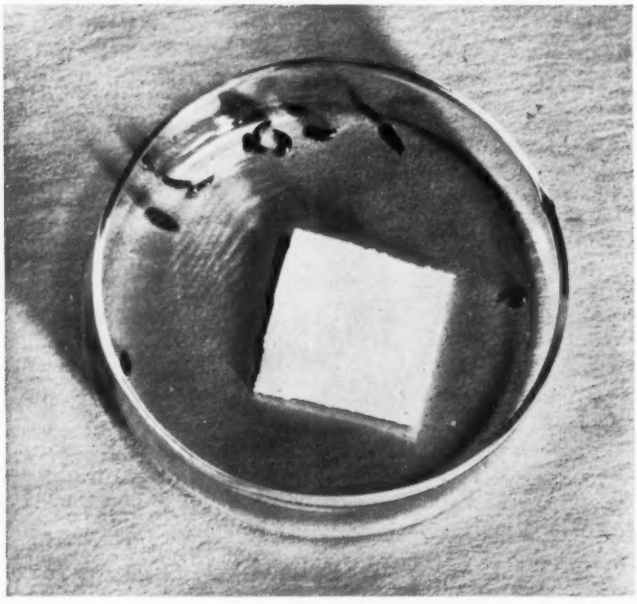
DDT For Mothproofing

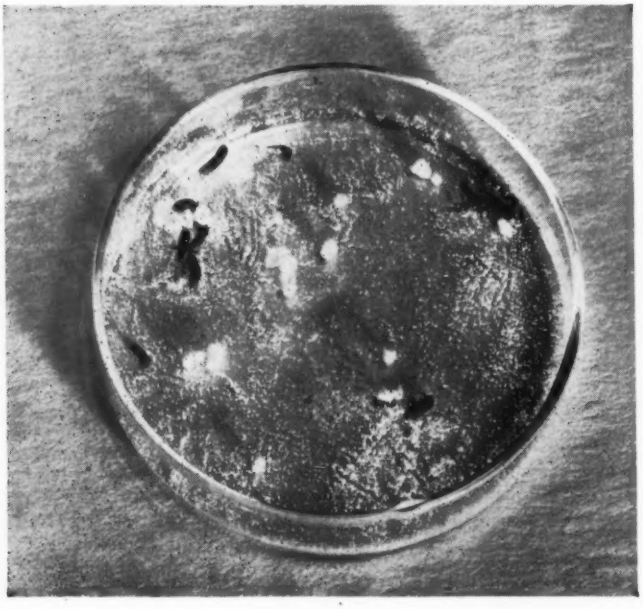
A novel process to prevent moth damage to clothes by impregnating them with DDT has been perfected recently by the Whitemarsh Laboratories of the Pennsylvania Salt Manufacturing Co. Although arrangements have not been finalized for its commercial exploitation it is anticipated that the process will be introduced to dry-cleaners this spring.

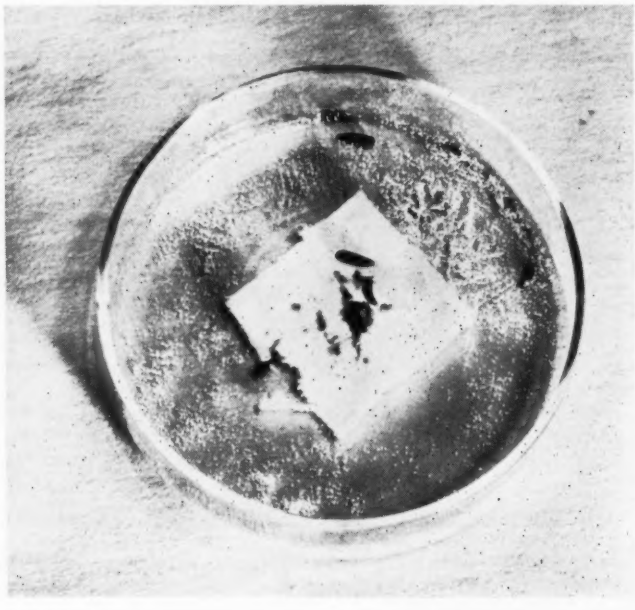
The method involves a mixture of DDT and an adsorbent powder and a pump percolator machine which dissolves the insecticide in the dry cleaning solvent. The machine sprays this solution on the clothes in the dry cleaner's extractor.

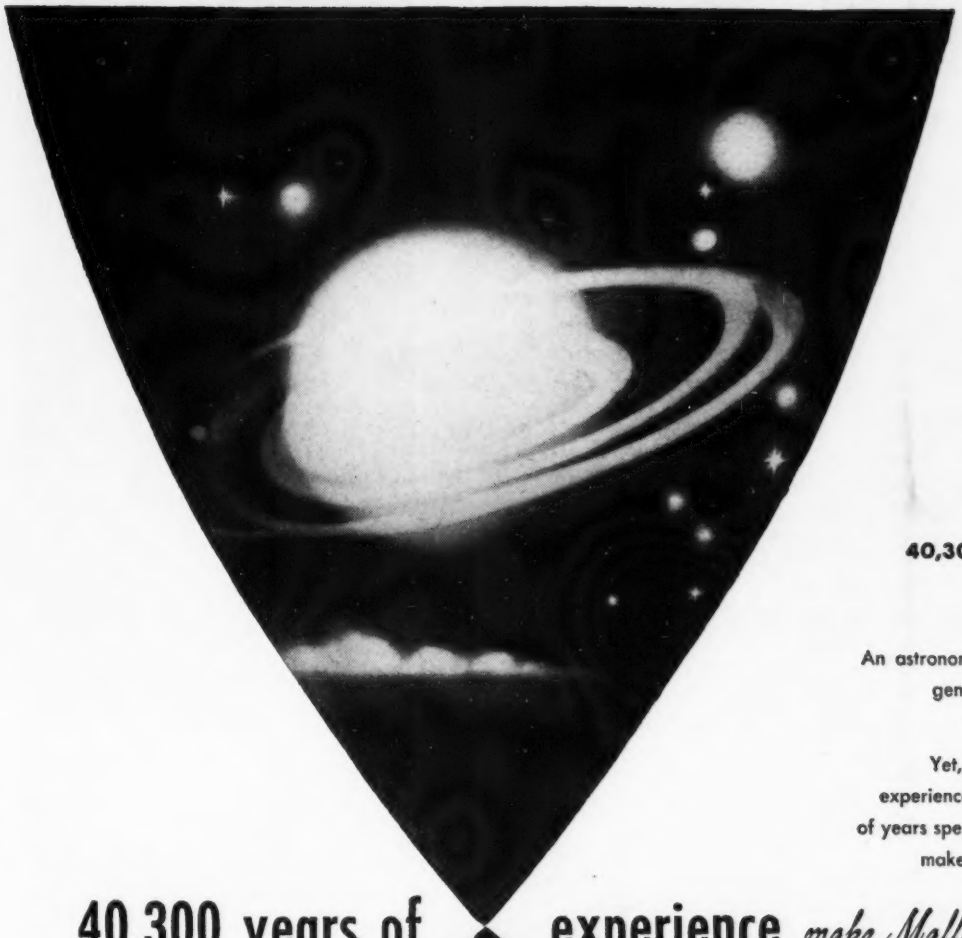
Pictured above is the unit itself, with the operator placing DDT-adsorbent in the receptacle. Clockwise, are a DDT-treated piece of wool, untouched by carpet beetles; untreated wool, largely devoured by beetles; and the same sample a few hours later.

Damage by moths amounts to more than $200 million annually in the U. S.









40,300 man years of working together are the foundation of each grain of Mallinckrodt chemicals.

An astronomical number of man hours over four generations have expanded and improved Mallinckrodt research and production.

Yet, there is more to Mallinckrodt's skill and experience than mere man hours and thousands of years spent in the laboratories and plants which make up the Mallinckrodt Chemical Works.

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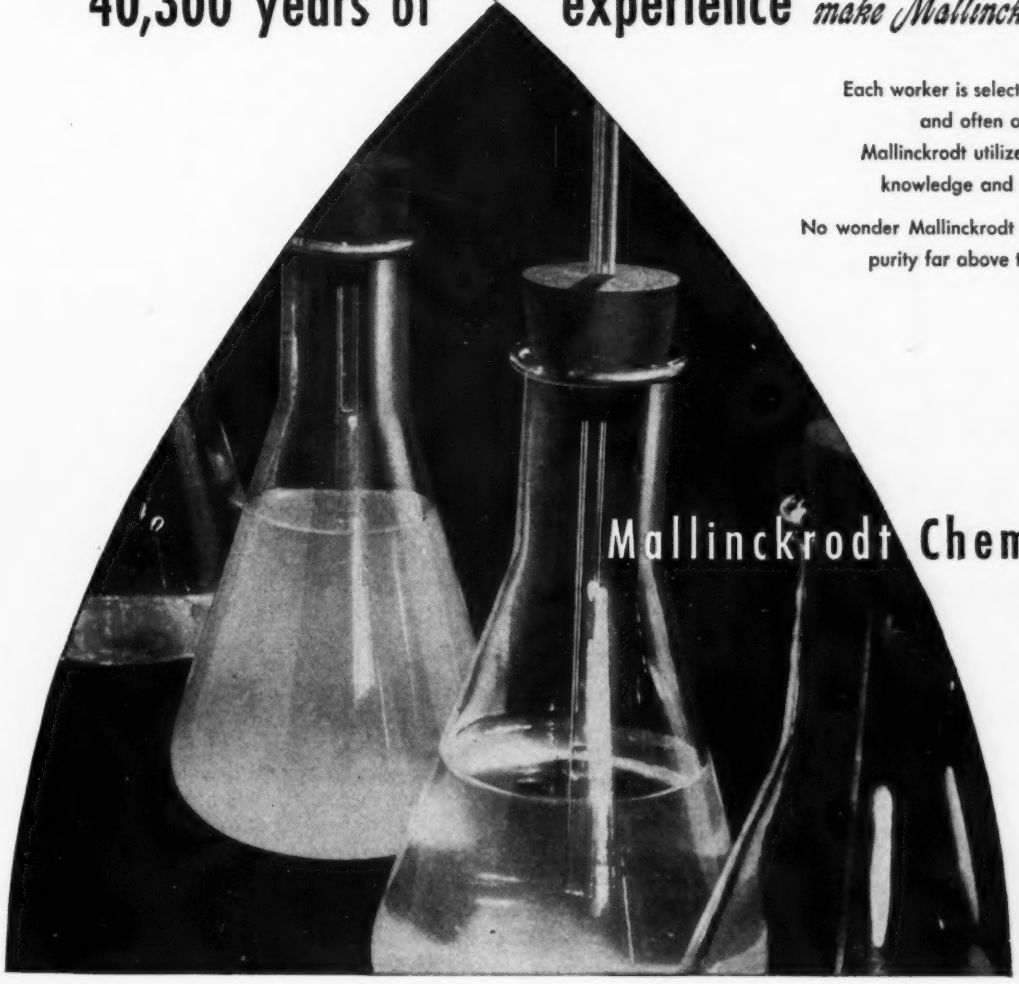
Each worker is selected on the basis of high standards and often of previous experience in his field. Mallinckrodt utilizes in the aggregate this wealth of knowledge and skill to guarantee quality to you.

No wonder Mallinckrodt chemicals represent a degree of purity far above the accepted standards of "pure." No wonder everyone who wants the best specifies Mallinckrodt.



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BETWEEN THE LINES

Big Increase in Atom Development Indicated by Budget Request

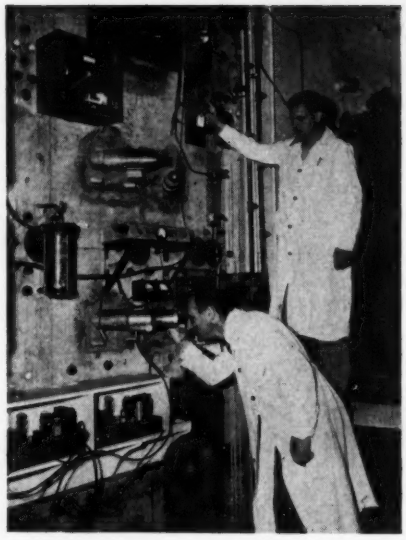
Tremendous expansion of exploratory and development activity in the atomic energy field is provided for by the budget just transmitted to Congress.

THE newly established Atomic Energy Commission, which will be responsible for both military and industrial development of nuclear possibilities, is aliotted $443,000,000 in the presidential budget recommendation for the fiscal year beginning July 1. Provision is also made by other funds for the first peacetime atomic research program at the Bureau of Standards.

It remains to be determined what an economy-committed Congress will do to all budget proposals. The threats to date have been addressed primarily to more direct military and naval expenditures, and those of various holdover wartime agencies. The leadership generally attributed to the United States in atomic energy exploitation is considered to be a strong argument with influential members of Congress in behalf of these expenditures. This supposed leadership has been the strongest diplomatic weapon possessed by American representatives abroad—primarily in the sense that other nations believe the United States can impart data and techniques they themselves lack.

This is the background against which the budget proposals are made.

Special interest attaches to provisions for expansion of atomic work at the Bureau of Standards. The Bureau up to now has not been equipped for study of radiation beyond 1,400,000 volts. The budget provides for purchase and installation at the Bureau of one 100,000,000-volt betatron, at a cost of $415,000, and one 50,000,000-volt betatron.



Making radioactive isotopes at Oak Ridge

The betatrons were requested primarily for facilitating medical and industrial research in radiation, for which a part of the total amount allotted to the Atomic Energy Commission apparently will be made available. In this connection, the Commission, under the budget, would receive an appropriation of $250,000,000, and authorization to contract up to an additional $250,000,000 for which appropriations could actually be made later. It is out of this total that it is estimated the Commission could spend approximately $443,000,000 during the year, if the recommendations are approved by Congress.

At the time Manhattan District operations were transferred to jurisdiction of the new Commission, which was created last Fall, a fund of around $375,000,000 for the current year's work was transferred to the Commission also.

It is contemplated that out of the $443,000,000 which would be expended in the coming fiscal year, contracts would be undertaken for construction of a number of new research projects, besides operation of existing facilities. The Commission has contracted for new laboratories at Chicago, Camp Upton, N. Y., and the vicinity of Schenectady, N. Y., for operation by private industry or universities under contract with the Commission. Continued in operation would be such older plants as Hanford, Wash., Oak Ridge, and the Los Alamos, N. Mex., atom bomb range and development center.

As to the Bureau of Standards, funds already are available for its new laboratory, for which a contract is to be let shortly. The betatrons, with necessary machinery, would be housed underground beneath the laboratory.

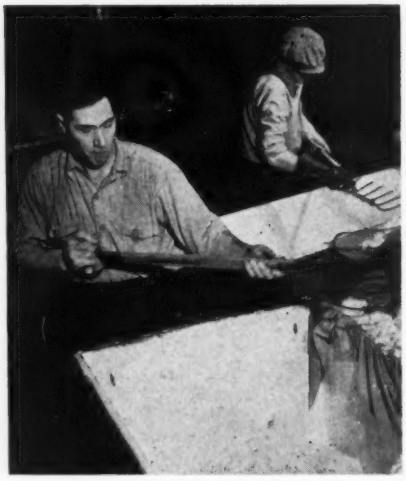
LABOR RELATIONS

by NATHAN C. ROCKWOOD

The Closed Shop Issue

In last November's elections three states adopted constitutional amendments to the effect that the right of persons to work shall not be denied because of membership or nonmembership in any labor organization. This conflicts directly with what has been standard N. L. R. B. interpretation of the National Labor Relations Act. The issue is one which seems capable of clarification only by Congress.

BEFORE the passage of the National Labor Relations Act and the establishment of the National Labor Relations Board to administer it, in 1935, numerous employers preferred to make closed-shop union contracts, even if only for selfish reasons. For one thing, it often eliminated friction and strife within their own organizations, for in shops part union and part open there was often subtle, if not obvious, annoyance of nonunion employees, which certainly did not help production efficiency. Since the N. L. R. A. and its rather biased administration by the Board, the picture has changed and the "maintenance of membership" and/or "closed shop" issue has become the cause of many employers' headaches.



". . . assuring the freedom of employees to organize and bargain collectively . . . was deemed to illegalize the closed shop."

Act Not Specific

The N. L. R. A. itself makes only one reference to closed-shop contracts: "It shall be an unfair labor practice for an Employer . . . [Section 8 (3)] by discrimination in regard to hire or tenure of employment or any term or condition of employment to encourage or discourage membership in any labor organization; provided, that nothing in this Act, or in the National Industrial Recovery Act . . . shall preclude an Employer from making an agreement with a labor organization . . . to require as a condition of employment membership therein, if such labor organization is representative of the Employees as provided in Section 9 (a) in the appropriate collective bargaining unit covered by such an agreement when made."

Laymen would probably interpret this as a prohibition against the employer's use of coercion or otherwise assisting a union to get unwilling members, just as much as it is a prohibition against the employer's use of similar methods to keep his employees out of a union. However, the reference to closed-shop contracts has been held by the Board and by some of the courts practically to permit employers to coerce their employees into union membership by contract, closed shop or maintenance of union, with or without check-off of union dues.

What happens then to the employer who signs a closed-shop contract which contains a proviso that he will fire any employee who is not in good standing with the union? The legal theory is that the union, being a private organization or club, has the sole right to judge a member's or an applicant's fitness for membership, as well as to set the amount of dues and initiation fees. Consequently, under the closed-shop contract, a union may drop a member for its own reasons and then demand that the employer fire him.

State Laws Conflict

Do the N. L. R. B. and the courts uphold the employer in keeping the terms of his contract? Unfortunately there has been no regular or well defined policy. The Board has vacillated first one way and then another. But now that Wisconsin and other States have adopted legislation limiting or prohibiting closed-shop contracts, the Board and the courts are taking a somewhat different attitude and are finding in specific instances that the employer who fires an employee for loss of union membership is guilty of an unfair labor practice and is subject to the penalties, which include reinstatement of the employee with full back pay.

Wisconsin has an Employment Peace Act which makes an employer guilty of an unfair labor practice if he discharges an employee for failure to join a union, if the closed-shop union contract was not authorized by a secret vote of three-fourths of the employees.

Now the N. L. R. A. provides for "Representatives designated or selected for the purposes of collective bargaining by the majority of Employees in a unit appropriate for such purposes." The Act left to the N. L. R. B. the definition of "the majority of employees," and the method of handling the elections. The Board decided to accept a majority of qualified votes cast, in place of "the majority of employees." Thus many unions have been elected as bargaining agents who actually represent only a minority of employees. Apathy, indifference, or actual hostility to the union keeps many from casting ballots. Hence the Wisconsin law requiring a 75% affirmative vote of all employees.

The distinction is important and was the reason given by the Wisconsin Supreme Court in a decision against a paper company which had discharged a nonunion employee on demand of an A. F. of L. union in compliance with a closed-shop contract. The company defended itself on the ground that the union had been certified by the N. L. R. B. after an election held under its auspices, and consequently that the State Employment Relations Board had no jurisdiction. The State Board had ordered the employee reinstated with back pay because three-fourths of the employees had not authorized the contract. The Wisconsin Supreme Court sustained its State Board's decision, holding that the United States Supreme Court has not attempted as yet to construe Section 8 (3) of the N. L. R. A., which we have quoted above. The Wisconsin Suppreme Court did, in this decision, construe that section as merely an effort on the part of the Congress that enacted the law "to remove any possible restriction in the federal law on the right of employers and employees to bargain for a closed shop . . ."

The Court quotes from a Senate Committee report at the time the law was being debated: "The reason for the insertion (of the closed-shop proviso) was because by some interpretations, Section 7 (a) . . . assuring the freedom of employees to organize and bargain collectively, etc. . . . was deemed to illegalize the closed shop. The committee feels that this was not the intent of Congress when it wrote Section 7 (a), that it is not the intent of Congress today, and that it is not desirable to interfere in this drastic way with the laws of the several states on this subject. But to prevent a similar misconception of this bill, the proviso in question states that nothing in this bill, or in any other law of the United States, or in any code or agreement approved or prescribed thereunder, shall be held to prevent the making of closed-shop agreements."

(*Turn to page 339*)

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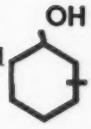
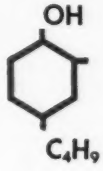


(mixture of *o* and *p* isomers)

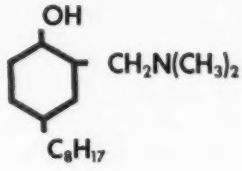
Liquid
Organic-soluble
Moderately water-soluble

o-Dimethylaminomethyl-p-butylphenol (DMP-14)



Liquid
Organic-soluble
Water-insoluble

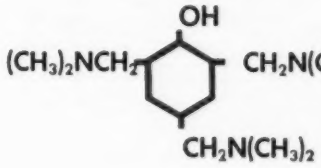
o-Dimethylaminomethyl-p-octylphenol (DMP-18)



Solid
Organic-soluble
Water-insoluble

The following product is available in *limited laboratory quantities:*

2, 4, 6-Tri (dimethylaminomethyl) phenol (DMP-30)



Liquid
Organic-soluble
Soluble in cold water but only slightly soluble in hot water.

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Corrosion inhibitors	Germicides	Dyestuffs
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NEW PRODUCTS & PROCESSES

Vinyl Ethers NP 441

The first of a proposed series of new vinyl ethers will be produced in the near future at Carbide and Carbon Chemicals Corporation's South Charleston, West Virginia plant. They are vinyl ethyl ether, which will be available in commercial quantities; vinyl isopropyl ether, available in pilot plant quantities; and vinyl ethylhexyl ether, available in experimental quantities. Their production is expected to start early in 1947.

The vinyl ethers have been considered almost laboratory curiosities in the United States, although their utilization has been developed to a considerable degree in Germany. It is expected that they will rapidly take their place as one of the important groups of chemicals available to American industry.

The vinyl ethers undergo most of the reactions typical of unsaturated compounds, and unite with many compounds containing active hydrogen atoms.

These reactions offer many possibilities in organic synthesis.

Physical properties:

	Vinyl Ethyl Ether	Vinyl Isopropyl Ether	Vinyl 2-Ethylhexyl Ether
Molecular Weight	72.1	86.2	156.3
Boiling Point (760 mm. Hg)	35.8°C.	55.0°C.	182°C. (extrapolated) 61-63°C. (10 mm.)
Specific Gravity at 20/20°C.	0.755	0.754	0.810 (20/15.6°C.)
Refractive Index, $\frac{n\ 20}{D}$	1.3763	1.3845	1.4232 (30°C.)
Weight per Gallon	6.28 lb.	6.28 lb.	6.75 lb.

The known vinyl ethers range from vinyl methyl ether which is a gas boiling at 5° C. to waxlike balsams such as the vinyl ethers of alcohols from naturally occurring waxes like Montan wax.

Because of their reactivity, the vinyl ethers offer interesting possibilities both in chemical syntheses and in polymerizations. The polyvinyl ethers are pale yellow to light brown materials ranging from liquids to rubbery solids and waxlike balsams. The characteristics of the polymers may be varied almost at will by changing conditions or catalysts and by proper choice of the monomeric ethers. The polyvinyl ethers have found application as adhesives and plasticizers, coatings, and lubricants. As adhesives they have been used in surgical tapes and elastic bandages where they are most stable to light and show better storage stability than rubber; in pressure sensitive adhesives for sealing envelopes, paper cartons, and ribbon adhesives; for laminating glass; for installation of upholstery in motor cars; for sealing cellophane and metal foils; and for cementing other materials to glass.

The vinyl ether polymers have also found many uses in plastic compositions as modifiers of vinyl resins and polystyrene. Copolymers have been prepared with vinyl acetate, acrylic esters, acrylonitrile, styrene, and many other compounds. The vinyl ether polymers have been used as plasticizers and tackifiers for synthetic rubbers, nitrocellulose and other resins, in synthetic polishing waxes, for giving a lustrous appearance to resin coatings, and for impregnating paper and textiles. The liquid polymers have been suggested for replacing oils in subsoil and submarine cables. When copolymerized with tall oil esters, the vinyl ethers can be used as binders in floor coverings.

Stabilizer for Clear Plastics NP 442

Plumb-O-Sil, a stabilizer produced in two types for use with vinyl chloride or vinylidene chloride polymers, has recently been developed by the National Lead Company.

The new additive is co-precipitated lead orthosilicate and silica gel in the form of a soft, white powder, and is particularly adapted for use when it is desired to produce a clear plastic.

Actually, the new stabilizer can be tailored to fit the particular characteristics of the plastic being used. For example, Plumb-O-Sil A is produced with a refractive index of 1.64 to 1.67, making it an ideal stabilizer for use in vinylidene chloride plastics, while Plumb-O-Sil B, with a refractive index of 1.58 to 1.60, is designed for use with vinyl chloride-acetate plastics of approximately similar refractive index.

Properties:

Plumb-O-Sil A	
Lead Content (% PbO)	60 to 61
Silica Content (% SiO_2)	39 to 40
Specific Gravity	4.1
Refractive Index	1.67
Plumb-O-Sil B	
Lead Content (% PbO)	49 to 50
Silica Content (% SiO_2)	50 to 51
Specific Gravity	3.3
Refractive Index	1.58 to 1.60

Either type may be used when the vinyl or vinylidene plastic application requires a stabilizer without tinting strength and one which will cause minimum impairment either to dye or other pigment additions.

Carnauba Substitutes NP 443

Two new grades of wax which may be used as substitutes for Carnauba wax—Carnauba Wax #352 and Refined Vegetable Wax #717—have been put on the market by Innis, Speiden & Company. Carnauba Wax #352 has a melting point of approximately 178-180°F. and can be used in carbon paper and paste wax to replace Carnauba. Refined Vegetable Wax #717 has a melting point of 164-167°F. and can be used for water wax emulsions. Both waxes are emulsifiable.

Dyeing Assistant NP 444

Rexon O, a clear viscous liquid that is readily soluble in cold and warm water, is a new dyeing assistant which promotes level dyeing and improves the penetration of the dye bath when used in the dyeing of cotton, viscose, acetates and other fibers. Produced by the Dexter Chemical Corporation, it is recommended in the dyeing and stripping of vat dye-stuffs. It protects the bath from the effects of hard water. Concentrations of from two to eight ounces per hundred gallons will give

Columbia's Technical Staff

presents

Developments in the Field of

Phosgene Chemistry

DIGLYCOL CHLOROFORMATE

$$O(CH_2CH_2\text{-}O\text{-}CO\text{-}Cl)_2$$

as an intermediate for synthesis—the lowest cost reagent of its type for uses in which an organic acid chloride is necessary.

•

ALLYL DIGLYCOL CARBONATE

$$O(CH_2CH_2\text{-}O\text{-}CO\text{-}O\text{-}CH_2\text{-}CH=CH_2)_2$$

as a modifying ingredient in polymerizing monomer, as a material for preparing clear, hard thermoset castings.

•

BUTOXYETHYL DIGLYCOL CARBONATE

$$O(CH_2CH_2OCOOCH_2CH_2OCH_2CH_2CH_2CH_3)_2$$

as a plasticizer for polyvinyl chloride. Butyl, phenyl, and cresyl derivatives are also available.

•

DIGLYCOL CARBAMATE

$$O(CH_2CH_2OCONH_2)_2$$

as a modifier for urea-type resins to increase toughness.

•

DIMETHYL CARBONATE

$$CH_3\text{-}O\text{-}\overset{\overset{O}{\|}}{C}\text{-}O\text{-}CH_3$$

as a modifying agent, solvent or intermediate.

Typical examples of Phosgene derivatives developed for commercial use by the Columbia Technical Staff are presented here.

If you are interested in utilizing the *products of phosgenation in present or contemplated operations* you will find Columbia facilities of especial value.

Information on Request

You are invited to write for Technical Bulletins on any of the products listed—*or to initiate discussions of problems related to Phosgene chemistry.* In writing, please use your company letterhead.

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the desired results. This product is said to be more convenient to use than glue and at the same time it prevents accumulation of oxidized vat colors on the surface of the dye-bath.

DDT Process for Moth Control NP 445

A process to prevent moth damage to clothes by impregnating them with DDT has been perfected by Pennsylvania Salt Manufacturing Company, and soon will be made available to the public.

The new method, which thoroughly impregnates clothing with DDT without affecting the cloth in any way, involves a mixture of DDT and an absorbent powder and a pump percolator machine which dissolves the DDT in just the right amount in the dry cleaning solvent. The machine sprays this solution on the clothes in the drycleaner's extractor in such a way that the treating solution thoroughly saturates the garments, so that after drying minute amounts of DDT are deposited on nearly every fiber.

Aluminum Solder NP 446

All-State No. 39 aluminum solder rod is a new low-temperature rub-on solder that is applied without flux. As used on aluminum castings, this alloy has good matching color and fair corrosion resistance. It is recommended for filling and soldering where tightness is essential but strength is unimportant; and also for the repair of blowholes; for building up worn surfaces on aluminum castings; as well as for salvaging and making changes on foundry patterns. It is also excellent for repairing cracks in aluminum cylinder heads and for filling in surface defects where high temperatures must be avoided. This alloy is a product of the All-State Welding Alloys Co. Inc.

Wetting Agent NP 447

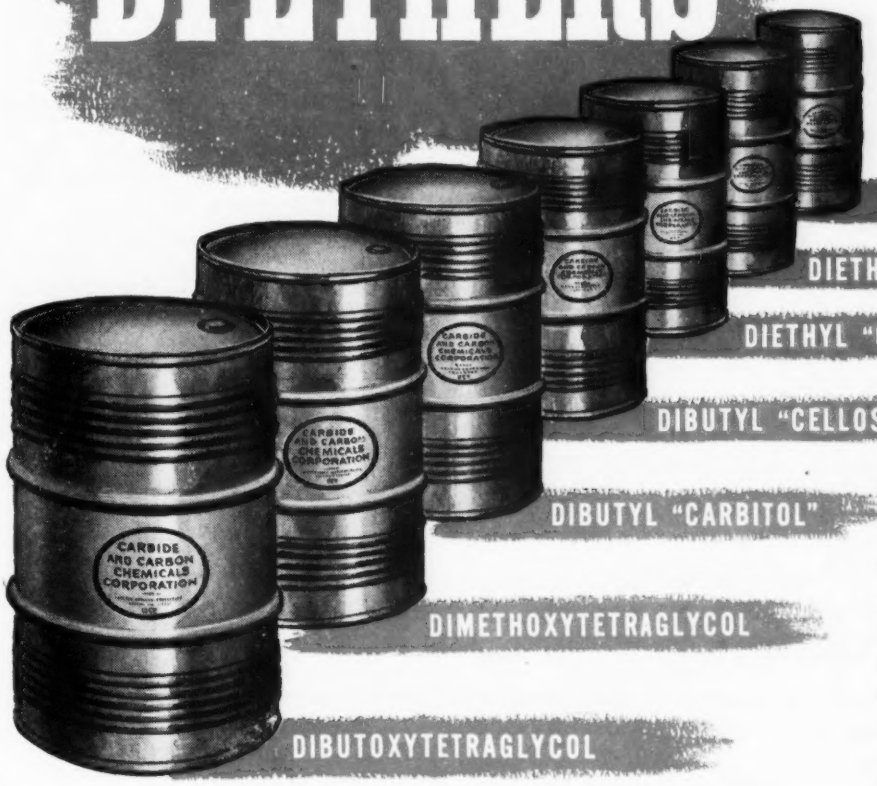
A flaked alkyl aryl sulfonate wetting agent, Sorbit P, has properties of detergency, wetting and foaming which make it applicable to the fields of textiles, cleaning, metal pickling, rubber and fire fighting. Made by the Alrose Chemical Company, Sorbit P is stable in acid or alkali, and generally shows improved surface-active properties in moderate concentrations of these as well as neutral electrolytes. The wetting properties are substantially unaffected by temperature changes.

Carbon 13 for Tracer Purposes NP 448

The heavy isotope of carbon, C^{13}, which may be used as a tracer, is now being produced in the 20 to 25 per cent range by the Eastman Kodak Company. Both radioactive and stable, the product is available at approximately $100 per gram of excess C^{13} in the 3 to 5 per cent range, $250 in the

GLYCOL DI-ETHERS are

- CHEMICALLY STABLE
- VERSATILE SOLVENTS



NAME	FORMULA	BOILING POINT °C. AT 760 MM.	VAPOR PRESSURE MM. Hg AT 20° C.	SOLUBILITY % BY WEIGHT AT 20° C. IN WATER	WATER IN
Dioxane	$O:(C_2H_4)_2:O$	101.3	29.0	Complete	Complete
Diethyl "Cellosolve"	$C_2H_5OC_2H_4OC_2H_5$	121.4	9.4	21.0	3.4
Diethyl "Carbitol"	$O(C_2H_4OC_2H_5)_2$	188.9	0.4	Complete	Complete
Dibutyl "Cellosolve"	$(CH_2OC_4H_9)_2$	203.3	0.2	0.2	0.6
Dibutyl "Carbitol"	$O(C_2H_4OC_4H_9)_2$	254.6	0.02	0.3	1.4
Dimethoxytetraglycol	$O(C_2H_4OC_2H_4OCH_3)_2$	275.8	0.01	Complete	Complete
Dibutoxytetraglycol	$O(C_2H_4OC_2H_4OC_4H_9)_2$	237 at 50 mm.	0.01	1.3	4.8

These seven glycol di-ethers are now supplied in commercial quantities for use as solvents, as inert reaction media, and as plasticizers. Although they are all stable, colorless liquids, they differ sufficiently in other properties to permit a wide variety of applications.

Dioxane is one of the most powerful solvents known for cellulose derivatives, dyes, fats, greases and many other organic and inorganic compounds. Dibutoxytetraglycol has excellent solvent power for the insecticide DDT, dissolving more than 50% by weight. Dibutyl "Cellosolve" and Dibutyl "Carbitol" show promise as dispersing and coupling agents. Since Diethyl "Cellosolve" and Diethyl "Carbitol" dissolve both oil and water they are useful mutual solvents.

Write for samples and further information.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York 17, N. Y. Offices in Principal Cities

Distributed in Canada by Carbide and Carbon Chemicals, Limited, Toronto

"Cellosolve" and "Carbitol" are registered trade-marks of Carbide and Carbon Chemicals Corporation

16.1 to 18.0 per cent range, and $400 at 23.1 to 26.0 per cent. Initially the C^{13} will be available as potassium cyanide, although it is expected that synthetic organic compounds containing C^{13} will be produced later. Among the first of these will be methanol.

Vinyl Stabilizer NP 449

Tribase is a new hydrous, tribasic lead sulfate manufactured by the National Lead Company. Possessing a high degree of basicity, it may be utilized in any application calling for a white basic lead salt. It provides a practical means of reducing the number of base compounds employed in processing vinyl plastics.

Tribase has a total lead content equivalent to 90% PbO, while its available lead oxide content is 67.3. Properties are as follows: formula, $3PbO \cdot PbSO_4 \cdot H_2O$; form, extremely fine powder; molecular weight, 990; specific gravity, 7.1. Its white color makes it adaptable in uses where stability to light, heat and moisture is important, and the electrical characteristics of vinyl compounds containing this product are exceptionally good.

Di-tert-Butylbenzene NP 450

A white crystalline solid hydrocarbon, *p*-di-*tert*-butylbenzene, is now available as a research chemical from the Chemical Products Department of the Standard Oil Co. (Indiana). This material offers promise as an intermediate in the preparation of various organic chemicals through nitration, sulfonation, oxidation, and other reactions in the production of a variety of products of interest to the chemical, dyestuff, paint, plastics, synthetic fiber, textile, pharmaceutical, and perfume industries. This product is potentially available on a commercial scale.

Freezing Point, °C.		76.9
Boiling Point, °C. at 760 mm		235.8
Bulk density (g/ml)		0.6
Purity (w% *p*-di-*tert*-butylbenzene)		98.5
Ash, w%		none
Acid value, Mg.KOH/gm.		<0.1
Solubility (g/100 ml. of solvent)		
	25°C.	65°C.
Alcohol (95%)	2.2	34
Ethyl ether	55	.
Benzene	75	420
Carbon tetrachloride	95	585
Water	nil	nil

Color for Rubber and Plastics NP 451

Poly-Tint aqueous dispersions are true dispersions of pigments, in liquid form, for the coloring of latices and aqueous dispersions of natural and synthetic rubber, polyvinyl chloride, polyvinylidene chloride, and similar materials. These dispersions are highly fluid and the pigments used are light-fast and stable.

The use of these colors is simple. No grinding or other preliminary treatment is necessary. The requisite amount of Poly-Tint is added directly to the latex or emulsion with simple agitation. They are now available from the Wilmington Chemical Corp. in four basic colors: 800A-Red,

■ Calcium Nitrate

REAGENT • PURIFIED • TECHNICAL

Available forms range from the four-water crystal reagent grade product assaying 101-104% $Ca(NO_3)_2 \cdot 4H_2O$, (35% H_2O) to the essentially anhydrous technical grade assaying 98% min. $Ca(NO_3)_2$, (2% H_2O). All are low in metallic impurities, particularly copper, nickel, iron and manganese. Such a selection provides a product suitable for any of the industrial applications of Calcium Nitrate, some of which are: in the production of rubber goods; starch adhesives; radio tubes and electric light bulbs; explosives, matches and pyrotechnics; in the preparation of heat transfer salts and compositions for treating incandescent mantles; as well as a number of patented processes.

For Your Fine Chemical Needs

■ Potassium Nitrite

TECHNICAL AND CRYSTAL, REAGENT

Production of technical grade Potassium Nitrite in commercial quantities was pioneered by Baker & Adamson Research to meet vital wartime needs. Now this Fine Chemical is available to Industry exclusively from B&A for a host of wide-ranging uses, including: regeneration of heat transfer salts; removal of scale from tungsten rods; manufacture of diazo dyes; as a rust inhibitor, etc. The fused lump technical grade assays 90% min. KNO_2.

Rely on General Chemical's

■ Zinc Formate

Another example of a laboratory chemical brought into commercial production by B&A to meet customer requirements. The purified grade offered is in white, free-flowing granular form, assaying 99.5% $Zn(CHO_3)_2 \cdot 2H_2O$, and low in metallic impurities. New as an industrial chemical, Zinc Formate holds promise in many fields. Suggested uses include: as a catalyst in manufacture of methyl alcohol; production of pure zinc oxide; agent for waterproofing cellulosic materials and weighting silk, etc.

Baker & Adamson Division

★ This is the second in a series of advertisements reviewing the B&A Fine Chemicals commercially available to American Industry today from the Baker & Adamson Division of General Chemical Company. Scores of such purity products await your investigation. To learn more about these or other B&A Fine Chemicals that meet your requirements, write or phone nearest B&A Sales and Technical Service Office.

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Albany* • Atlanta • Baltimore • Birmingham* • Boston • Bridgeport Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver • Detroit* • Houston • Kansas City Los Angeles* • Minneapolis • New York* • Philadelphia* • Pittsburgh* • Providence • St. Louis* San Francisco* • Seattle • Wenatchee (Wash.) • Yakima (Wash.)
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here.

FINE CHEMICALS
BAKER & ADAMSON B&A QUALITY
STANDARD OF PURITY
FOR AMERICAN INDUSTRY

810A-Blue, 820A-Yellow, and 830A-Black. Practically any other shade can be produced from these four colors.

Also, Poly-Tint plastics stains have been developed for the coloring of various plastics by dipping methods.

There are two types: the first, the 600 series, is designed for coloring cellulose acetate, cellulose acetate butyrate, ethyl cellulose, polyvinyl chloride, and other materials in the same class; the second type, the 700 series, is designed for coloring methyl methacrylate and polystyrene. Each of the above types is produced in four standard colors, from which any other color may be produced by blending.

The staining time can best be determined by simple experimentation on the plastic to be dyed. The average dipping time to obtain the usual requirement of color depth is from 30 to 50 seconds. However, the stains have been designed to give a minimum color change between 30 and 50 seconds dip time so as to allow considerable operation variation.

Following the dip operation, the stained articles are given a water-wash for setting the color and removing the superficial or unset color. After the water-wash, drying may be carried out by any desired method.

Poly-Tint Stains are designed for use at normal room temperature (70°F.) and should not be used above 110°F. The color intensity increases as the temperature is increased and, to insure uniform color, the temperature should be maintained as near constant as possible.

Adhesives For Use With Dielectric Heat NP 452

A new phenol-type adhesive has been developed by the Casein Company of America, Division of the Borden Company. It is especially formulated for bonding wood with radio-frequency equipment. The product is called "Cascophen RS-228." The new product eliminates one of the worst "bugs" in gluing with dielectric heat. It does not arc when electrodes come in contact with the squeeze-out of glue or with the glue line itself. At the same time, it allows the use of maximum power to provide quicker curing. This makes the radio-frequency method practicable for many new wood bonding operations.

Aircraft Lacquer NP 453

Monsanto Chemical Company has announced volume production of Skylac, a flame-resistant fabric finish for both exterior and interior surfaces of aircraft, which was initially developed for the armed forces.

The improved finish affords an additional safeguard as its burning rate is about one-fourth that of conventional finishes. It ignites more slowly and, unless heat is applied from without, the flame tends to snuff out.

On exterior control surfaces, Skylac has the same essential tauting effect as

PARASEPTS*

Parasepts, in the cosmetic field, finds its way into face and hand lotions, wave sets, cosmetic creams—the methyl or ethyl esters are used in aqueous solutions while the propyl and butyl esters are used in the creams and powders. The Parasepts are used in gums, mucilage, glue, carbohydrates, fats and oils which are subject to attack by yeasts, fungus molds or bacteria.

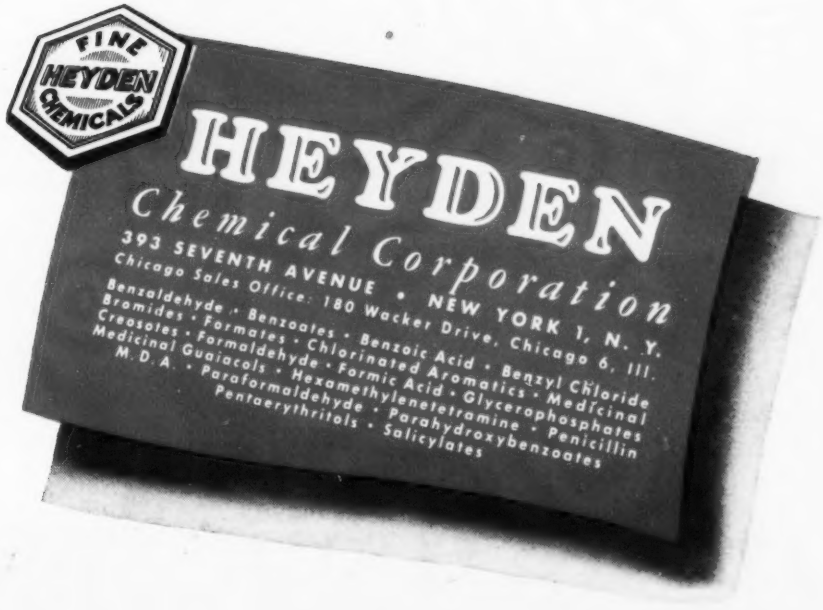
The Parasepts are also used as preservatives in pharmaceutical elixirs, textiles sizes, soap, wrapping paper for soap, casein based water paints and photographic gelatins.

Methyl Parasept Propyl Parasept Ethyl Parasept

Butyl Parasept Benzyl Parasept

FINE CHEMICALS BY HEYDEN

*Trade Mark, Reg. U. S. Patent Office



present finishes, but it can be applied with far less effort. It also contains a fungicide which protects the fabric from deterioration by mildew. The material is equally adaptable for inside finishes.

Cationic Softeners NP 454

Four products suitable for softening cottons and rayons are the latest additions to the line of textile chemical products of the Dexter Chemical Corporation. It is claimed that these products, Softol AC, AD, XAC and XAD, are especially satisfactory for softening cottons and rayon fabrics which have been finished with cellulose products such as Kopan, Celfon and Ceglin.

Softols AD and XAD are recommended where a soft but full hand is desired. The AC and XAC give a soft and thin hand.

AC and XAC are recommended by the Dexter Chemical Corporation where maximum anti-fume properties as well as high-softening are desired on acetate colors.

Interesting Patents

OBTAINING PRECIPITATED NICKEL compounds free of sulphur impurities from ammonium carbonate leach liquors containing nickel compounds dissolved therein and sulphur impurities, substantial amount of sulphur of which unites with nickel in water-insoluble form on expelling ammonia from solution, steps which comprise adding to product leach liquor soluble alkali metal compound, heating resulting mixture until nickel content is precipitated. No. 2,408,311. Robert Hills and Maurice Dufour to Nicaro Nickel Co.

2-METHYL-1, 2-PROPANEDIAMINE production comprises reacting 2-methyl-2-nitro-1-propanol with ammonia under pressure at 20 to 85°C., subjecting resultant mixture to hydrogenation in presence of a hydrogenation catalyst at elevated temperature and pressure. No. 2,408,171. Harold Johnson to Commercial Solvents Corp.

2-METHYL-1, 2-PROPANEDIAMINE production comprises subjecting 2-nitropropane, ammonia and formaldehyde to elevated temperature and pressure, then subjecting resultant mixture to hydrogenation in presence of a hydrogenation catalyst at elevated temperature and pressure. No. 2,408,172. Maryan Matuszak to Phillips Petroleum Co.

RECOVERING SULPHUR DIOXIDE from sulphur dioxide-containing comprises, contacting gases with ammonia and water to form solution of ammonium bisulphite; reacting ammonium bisulphite with ammonium acid sulphate to evolve sulphur dioxide and form solution of ammonium sulphate. No. 2,405,747. Arthur Hixson and Ralph Miller to The Chemical Foundation, Inc.

From the catalog of Barrett Basic Chemicals

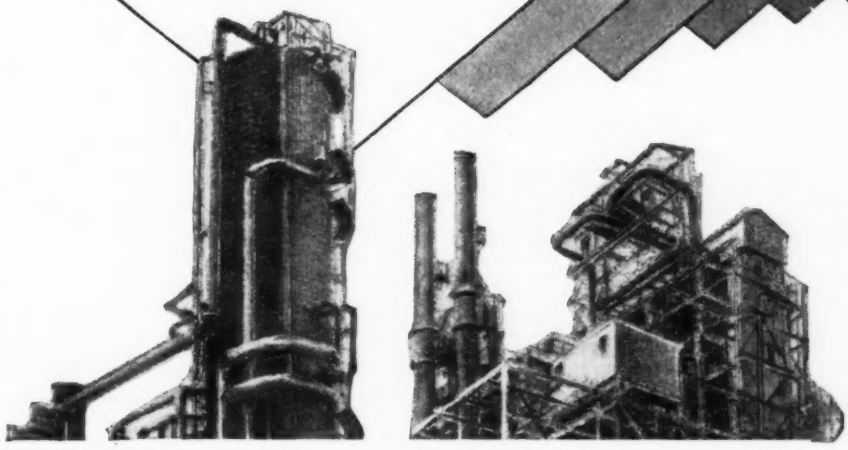
NAPHTHALENE

Separated and refined from coal-tar distillates.

Available in various forms ranging from brown lower melting to higher melting pure white crystalline types.

Used in preservation of hides, moth preventive, and in soil insecticides, as raw material for manufacture of organic chemicals and dyes, for alpha and beta naphthols and sulfonated derivatives. For chlorinated naphthalene, waxes, synthetic tanning agents, pharmaceuticals and plasticizers.

	Description and Applications
Crude	74°C minimum melting point. Shipped in tank cars.
	78°C minimum melting point. Shipped in light wood barrels and tank cars.
Refined	79.4°C minimum melting point. Shipped in bags, light wood barrels and tank cars.



THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

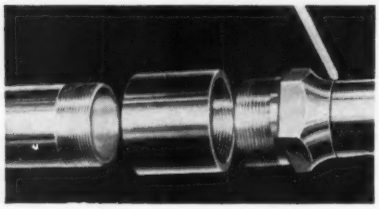
Barrett

NEW EQUIPMENT

Stainless Steel Fitting QB 143

By use of a new adapter fitting thin-walled stainless steel tubing may now be used in many piping installations where standard IPS stainless pipe is also used, according to the Electric Steel Foundry.

In use the tubing is butt-welded to the adapter and thus is permanently fitted



with standard pipe threads and can be assembled as any pipe. A system using this method is readily dismantled for cleaning or inspection.

The use of this adapter fitting permits the incorporation of stainless tubing in lighter take off systems from an already established standard piping layout, and it also makes practical the use of tubing in place of the more costly standard stainless pipe in making installations where tubing would be equally suitable, and is called the Esco P-T adapter. It is an addition to a full line of stainless steel flanged and screwed pipe fittings manufactured by Electric Steel Foundry.

Hammer Mill QB 144

The addition of a new, heavy-duty model hammer mill to the 16 standard types has been announced by the Buffalo Hammer Mill Corp.

This new model hammer mill has an overall height of 47", base 53" x 38", charge opening 24" x 30".

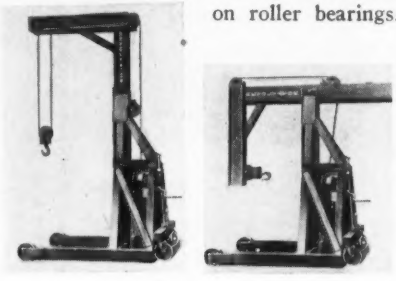
Product may be discharged in two ways —by gravity from the bottom of the machine and by conveying pneumatically to a collection system. The mills are available from ½ to 200 H.P. and speeds of 1000 to 7500 R.P.M. capacities.

Folding Crane QB 145

The portable folding crane of Revolvator Co., is so designed that the upper part may be folded down to permit moving the crane under low doorways or other overhead obstructions. The folding feature is effected by the same crank and cable that is used for hoisting material.

This crane is equipped with low gear for lifting very heavy loads. The crank handle is placed on the center shaft or lower shaft according to weight to be lifted. The maximum capacity of this portable crane is 4000 lbs.

The crane is equipped with floor lock, and steering handle geared to front wheels which turn on roller bearings.



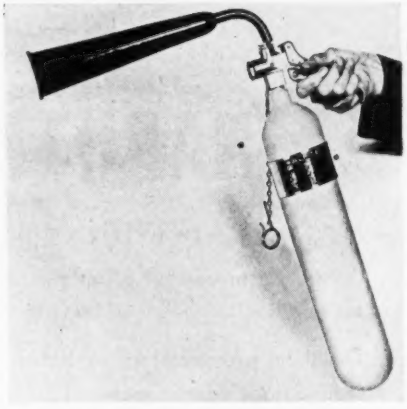
Air Motor QB 146

The new Model No. 1 explosion-proof air motor—a relatively low-priced, 2½ pound, 2¼" diameter model—of the Gast Manufacturing Co. may be used in place of electric motors on portable or stationary equipment, as it meets all safety requirements.

By centrifugal force, four one-piece sliding vanes, fitted in a shaft-mounted rotor, slide outward in a shell, presenting their surfaces to the incoming air, to cause rotation. The motor starts in any position, will not spark, will not burn out due to overload or sudden braking. It runs under constant low speed, as 100 RPM, without stalling and the speed varies from 0 to 6,000 RPM, H.P. from 0 to ⅙.

Fire Extinguisher QB 147

The new midget fire extinguisher of the American-LaFrance-Foamite Corp., the Alfco Speedex, weighs only 3⅝ lbs.



It is only 3 9/16" in diameter with an overall length of 22" and is operated by a quick acting squeeze-type valve which releases carbon dioxide by palm pressure.

The rating by the Underwriters' Laboratories is B-2; C-2, indicating that two such extinguishers make one unit of first aid protection for use on Class "B" fires (flammable liquids, greases, etc.) or Class "C" fires (electrical equipment).

It is shipped fully charged with wall hanger, screws, and record tag.

Temperature Measurement QB 148

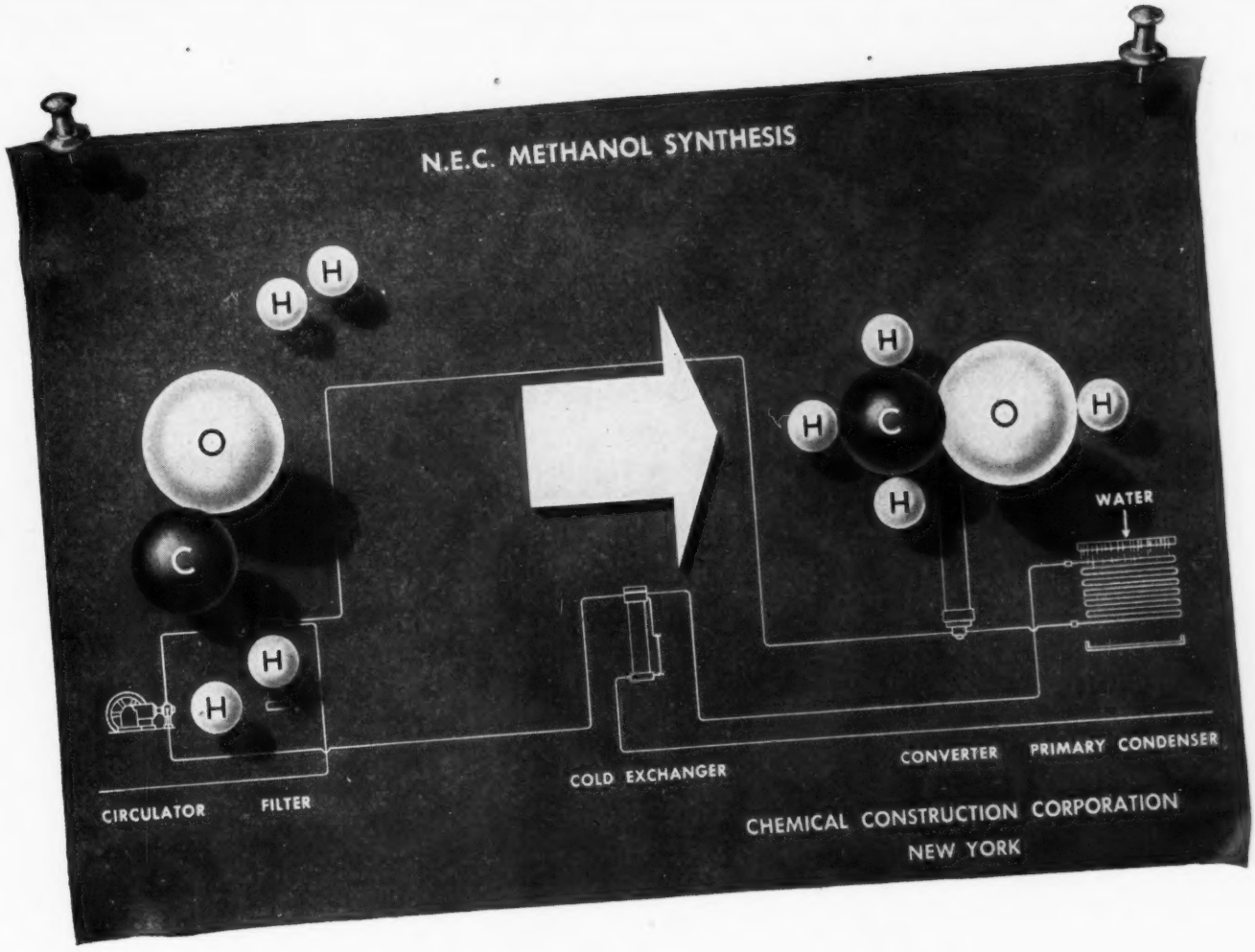
Tempil Corp. has extended the temperature range at which Tempilstiks can be used from 1300° F. to 1600° F. Tempilstiks measure temperature by the point at which the chalk-like mark, which they make on the surface, melts and forms a liquid smear.

New sticks have also been added, which allow the measurement of temperature at 12.5° intervals from 125-400° F. and 50° intervals from 400-1600° F.

Needle Valve QB 149

A new precision needle valve of Kerotest Manufacturing Co. affords complete safety of operation. Union nut construction prevents dangerous blow-outs during opening or repacking and also provides an extra deep stuffing box. Positive back seating allows the valve to be safely repacked under full line pressure. A metal-to-metal line seal at the bonnet eliminates the use of gaskets. Full port clearance prevents interference with flow characteristics by the nipples.

The new valve combines positive shut-



SYNTHETIC METHANOL
is best made by the
N.E.C. High-Pressure Process

The modern way to produce METHANOL is by high-pressure synthesis from hydrogen and carbon monoxide.

CHEMICO offers the N.E.C. High-Pressure METHANOL Synthesis Process, generally similar to the well-known and successful N.E.C. Synthetic Ammonia Process.

Preliminary recommendations for new plants or for altering existing synthetic ammonia plants for METHANOL manufacture are offered without charge or obligation.

CHEMICAL CONSTRUCTION CORPORATION
Empire State Bldg., 350 Fifth Ave., New York 1, N. Y.
European Technical Repr.: Cyanamid Products, Ltd.
Brettenham House, Lancaster Place, London W.C.2, England
Cables: Chemiconst, New York

CHEMICO *plants are profitable investments*

off with micrometer throttling action. The ball seat, which provides a positive line seal for complete shut-off, has a tapered tip, actuated by fine stem threads, which permits control of flow and also ease of operation at all pressures.

The entire valve stem, including ball seat and tapered tip is constructed of spe-

cially heat treated and work hardened stainless steel, ground and polished—to eliminate possible galling and wire drawing. The valve body is machined from solid rolled stock. The handwheel is an oblong iron casting which provides a firm, easy grip.

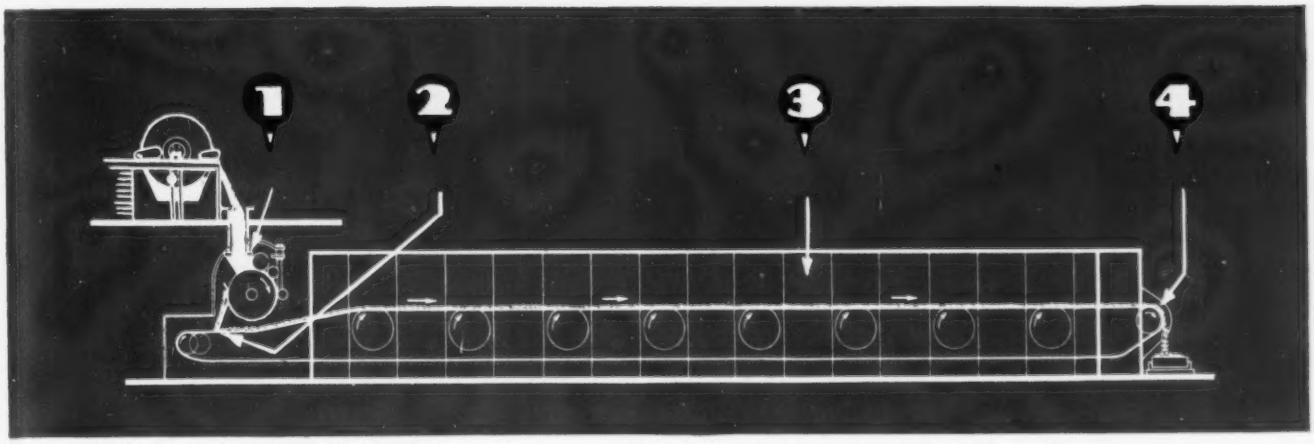
Kerotest needle valves are available in both globe and angle types in sizes from ⅛" to ¾" for working pressures up to 3000 lbs.; temperatures up to 750° F. They are made from cadmium plated carbon steel, 12-14 per cent chrome—Type 416 or 18-8 stainless steel—Type 316—or special alloys to meet any desired specifications.

High Frequency Voltmeter QB 150

The Alfred W. Barber Laboratories has developed a new high frequency electronic voltmeter, Model 32. By equip-

ping this instrument with a radio frequency probe having the extremely low input capacity of ¾ micro-microfarad, the instrument has the range of

Magnesium carbonate dried from moisture content of 565%* (B.D.W.B.) to 1.0% in 29 minutes



*This means 5.65 lbs of water per 1.0 lb dry material

in PROCTOR CONTINUOUS CONVEYOR SYSTEM

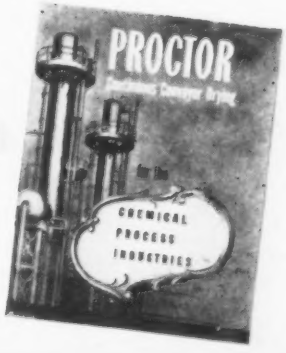
In one typical installation of a Proctor individually designed continuous conveyor system, for use in drying magnesium carbonate, here is what takes place: (1) Material with moisture content of 565% (B.D W.B.*) is delivered to pre-forming feed of dryer, from a continuous filter (2) Coming to the hopper of the fin drum feed in this highly moist state, the material is pressed into the grooved surface of an internally heated, revolving fin drum On this drum, the material is dried sufficiently to be discharged to the conveyor of the continuous dryer, in the form of small sticks of uniform thickness. (3) Loaded to uniform depth on the moving conveyor, the material is conveyed through the drying chambers where heated air at 290°F. is circulated *through* the bed of magnesium carbonate. By forming the material into small, uniform shapes, more rapid diffusion is possible, which accounts for rapid drying and uniformity (4) After only 29 minutes of drying time, magnesium carbonate, uniformly dried to a moisture content of 1.0% (B.D.W B.), is discharged from the dryer at the rate of 500 pounds (C.D.W.†) per hour

This particular application for one type of Proctor pre-forming feed, combined with a continuous conveyor dryer, illustrates just one installation. These systems are literally tailor-made to meet individual plant and product requirements . . . after careful research and study into the specific problem. If the drying of wet-solids is part of your operation, it will pay you to have Proctor engineers consider your problem. Write today.

†Commercial dry weight.

This is a case history taken from this new Proctor booklet

A new 12-page booklet on "Proctor Continuous Drying for the Chemical Process Industries" is available upon request. It contains many case studies showing the application for Proctor individually designed systems. Write for your copy of this informative booklet today.



PROCTOR & SCHWARTZ, INC. Philadelphia 20, Pa.

measurement extended ten times—from 50 to 500 megacycles. Since other existing probes are said to have an input capacity of 5 micro-microfarads or more, loading and detuning of very high frequency circuits is a serious problem.

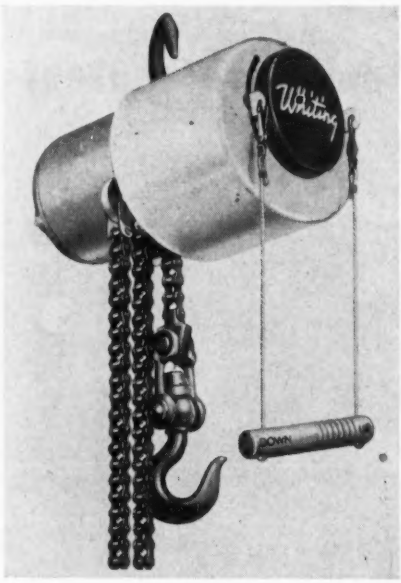
Model 32 offers better than 5% of full scale accuracy on all ranges and sinusodial voltages. It measures 0.3 to 300 volts r-f in five ranges (3, 10, 30, 100 and 300 volts full scale). The frequency range is 500 kilocycles to 500 megacycles. Input of impedance: ¾ micro-microfarad at a Q of about 200. Power supply: 115 volts, 60 cycles, 30 watts. Tubes: one 6AL5 in probe, two matched 6J6 and one 6X5GT rectifier.

Model 31 is 5½ x 9½ x 9½ and it weighs only 8 lbs.

Portable Electric Hoist QB 151

A new line of roller-chain electric hoists of ¼, ½, and one-ton capacity, has just been announced by the Whiting Corp. The one-ton hoist weighs only 87 pounds, and utilizes a simple, double-reduction, totally enclosed, worm-gear drive. Precision ball bearings are used throughout.

The hoist frame is a steel casting. Hence, the load is carried on steel from hook to hook, assuring maximum safety. A patented self-energizing motor brake, which does not require adjustment, interlocks with the controller to provide safe



operation. Upper and lower safety limit switches are provided.

The alloy steel roller chain operates over an extra large sprocket—assuring smooth operation and reducing chain wear. The load hook has a universal action and swivels on ball bearings, which prevents the roller chain from twisting. Control is by means of a single-bar grip, which can be operated by one hand, allowing the other hand to be free to steady the load.

An unusual feature of the new Whiting hoist is that it can be operated in an inverted position. This is an advantage where the overhead suspension point is high. Instead of carrying the hoist to the point of suspension, the cable is run out to the desired length, the hoist is turned upside down, and suspended from the hook. The load is then attached directly to the hoist.

Thermometer QB 152

A separable socket industrial thermometer—the Senior Midget, is being offered by the Accuracy Scientific Instrument Co. This makes it possible for the maintenance man to insert a new refill stem in a few minutes, without loss of production time.

The Senior Midget is available in angle and straight stem types with heavy armor pratection to resist corrosion and dirt.

Leak Detector QB 153

A new portable Leak Detector that can locate and measure leaks as minute as .00000001 cc. per second is now being manufactured by the Consolidated Engineering Corp. Based on the mass spectrometer principle, this instrument separates and measures helium molecules, by

For trouble-free flow control ....install POWELL Valves

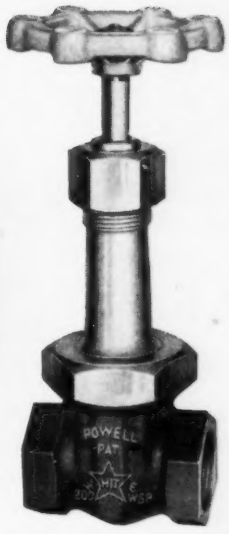


Fig. 375 — 200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel bronze disc.

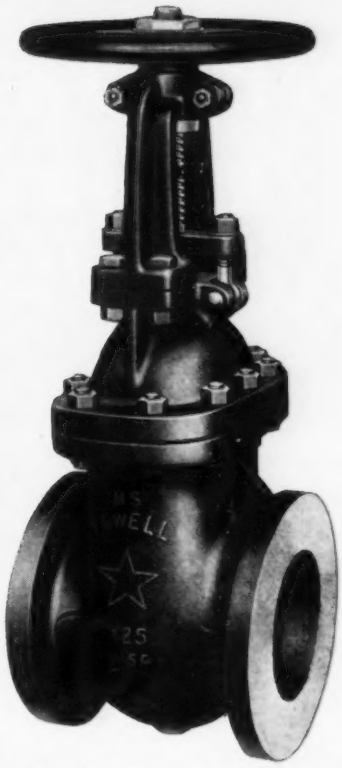


Fig. 1793—125-pound Iron Body Bronze Mounted Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Also available in All Iron.

There are at least two notable reasons why Powell Valves minimize flow control troubles. One is that every valve in the Powell Line has been scientifically designed to operate under certain specific flow control conditions—pressure, temperature and/or media. The other is that there's a Powell Valve for *every* operating condition, or set of conditions, known today.

That's why so many plants, representing every phase of modern industry, are now standardizing on Powell Valves.

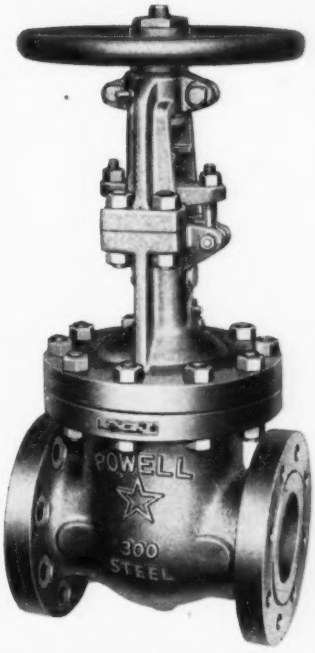


Fig. 3003—Class 300-pound Cast Steel Gate Valve with bolted flanged yoke, outside screw rising stem and taper wedge solid disc.

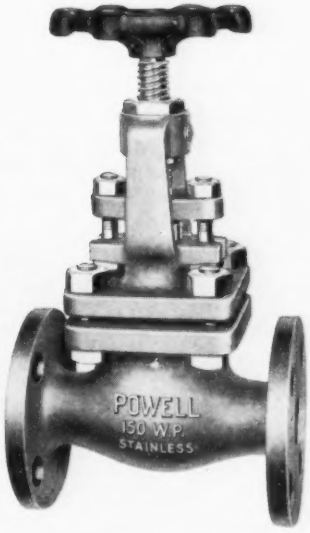
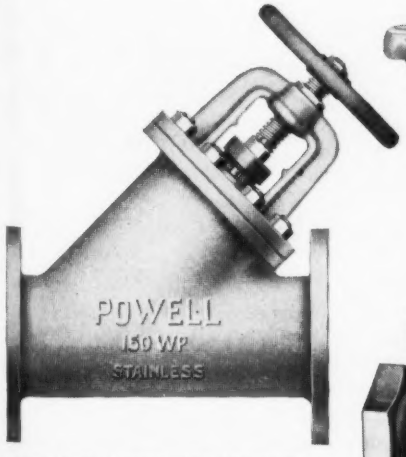


Fig. 1969—150-pound Stainless Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.



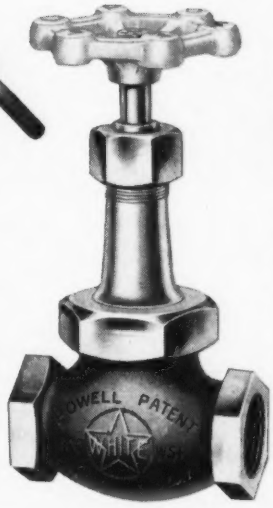


Fig. 1944—Large size 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem.

Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

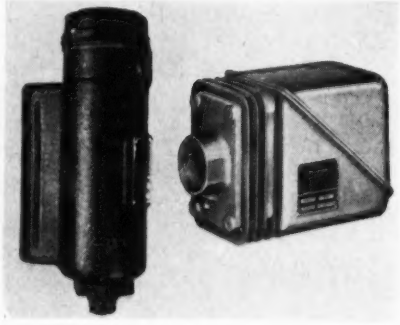
reason, only, of their mass, from all dissimilar molecules in the atmosphere. Introduction of helium in suspected areas will give an almost immediate indication on the visual meter or audio alarm system whenever any leakage is present. (cf. CHEMICAL INDUSTRIES, 58, 413, 1946.)

Selection of sensitivity over six different ranges can be had for measuring almost any rate of leakage. The size of the leak can also be determined with the audio system when using a helium probe at a distance from the instrument. The pitch of the leakage warning signal changes roughly in proportion to the leak size.

Standard readily available electrical and vacuum system components are used. The equipment is operated entirely from a standard 115 volt, 60 cycle lighting circuit.

Combustion Safeguard QB 154

Fireye combustion control, Type FI8TS, actually sees flames. When flame fails, Fireye instantly cuts off fuel or sounds an alarm. Unlike thermal controls, Fireye is actuated not by the effect of flame failure, but by the flame itself.



Fireye F18TS of the Combustion Control Corp. consists of a phototube and amplifying system housed in a dust-tight aluminum case. The entire control is mounted directly on the furnace wall and is aligned in a manner which permits the photoelectric cell to observe the flame through a 2" pipe connection which serves as a sighting tube and a support for the equipment.

Type F18TS protects against dangerously low boiler water level by means of a single probe which is mounted in auxiliary fitting Type 65BF1. The probe fitting is mounted parallel to the boiler water column and wired to Fireye Control. The bottom of the probe defines the danger point below which boiler water must not fall.

A 115 v. or 230 v. 50-60 cycle AC power supply operates over an ambient temperature range from 32-150° F. The front of the control should be within five feet of the flame.

Counter QB 155

The new single channel predetermined counter, Model 140, manufactured by the Potter Instrument Co., will count and control at rates of 15,000 per minute and higher if required.

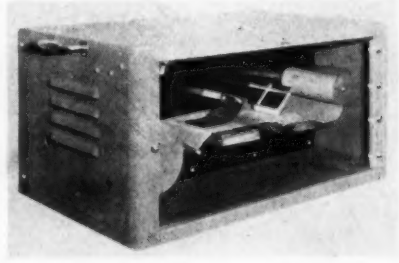
The desired count is initially set up by means of dial switches on the front panel of the instrument. When the predetermined number of items has been counted the unit actuates a control which is used to automatically stop or divert the flow of materials. The predetermined counter can be set to recycle automatically, or manually by means of a remote control switch. When automatic reset is used the instrument will reset in 2 milliseconds.

The unit utilizes four standard Potter 4-tube counter decades which are arranged to permit the use of any predetermined number from 0 to 10,000. Other models are available which provide two separate predetermined channels for the control of two-step sequential processes, such as in the manufacture of zipper fasteners.

The input to the counter can be derived from the interruption of a photoelectric beam, contact closures, shaft rotation, reciprocating members, electromagnetic field disturbance and many other actions which are representative of counts. The output consists of an ultra-high speed double pole single throw relay which is readily adaptable to solenoid actuation of existing controls.

Flaw Detector QB 156

A new flaw detector of the General Electric Co. can continuously detect and count the holes, weak spots, and conducting paths in thin materials such as paper, sheet rubber, sheet mica, varnished cloth, plastic materials, and enamel films on wire during the manufacturing process. The new instrument permits quality standards to be set up close to the point of manufacture so that variations in quality can be quickly detected and correcting adjustments made with a minimum of waste.



The new flaw detector can be applied to sheet materials up to .025" thick moving as fast as 450' per min. and to wire moving up to 100' per min. It consists of an electrode assembly through which an adjustable voltage is applied to the material undergoing test, and an electronic circuit which indicates the flow of current through the material which occurs when a flaw passes under the electrode. Electrodes have been especially designed for use with specific materials.

The new flaw detector can be made to

ALOYCO Stainless Steel Valve Success Is Due to 2 Primary Factors

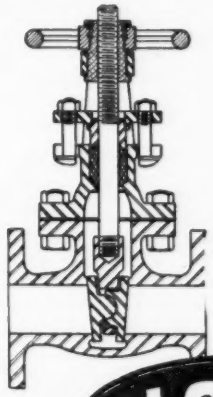
1. Wide Selection of Corrosion-Resisting Alloys
2. Excellence of Design and Construction

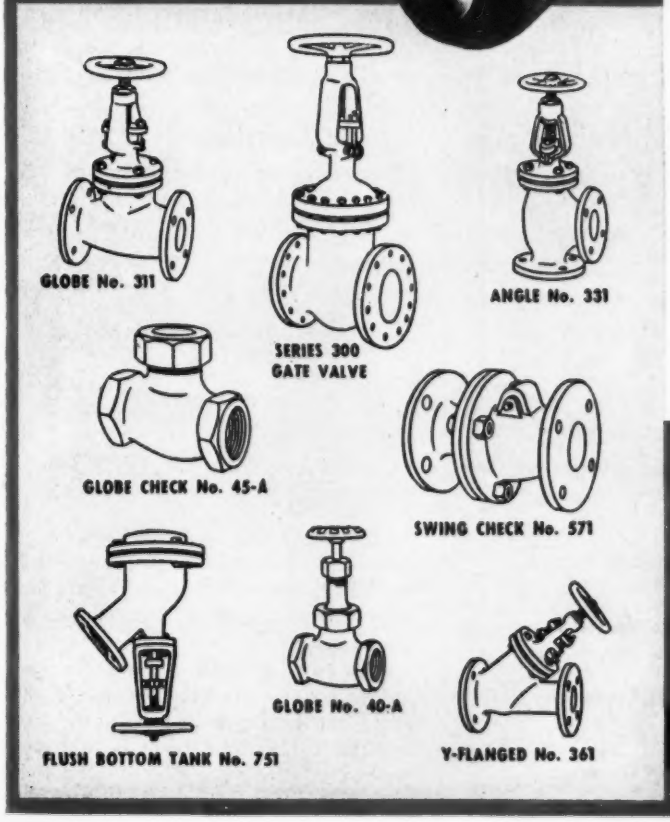
ALOYCO Valves and Fittings are made in a wide variety of stainless steels and other corrosion-resisting alloys. Each of these differs from all others in relative resistance to various corrosive fluids, under different conditions of temperature and concentration. It has taken us many years of specialization in the manufacture of corrosion-resisting valves, exclusively, to gain the experience which enables us to recommend the *one best alloy* for any specific application.

Of equal importance with the selection of the correct alloy, is the quality of design and construction of the valve. In pattern shop, foundry and machine shop, particularly, corrosion-resisting alloys require very different handling from all other metals. Here again, our concentration on corrosion problems makes Aloyco Valves distinctive for mechanical excellence. You get more out of Aloyco Valves, because we put more into them. Consult us on your requirements.

ALOYCO GATE VALVE NO. 111

• This popular valve has double-disc, ball-and-socket type wedges that are free to rotate and are non-fouling in any position. The design insures tightness on both seats and permits easy repairs.





ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

GATE, GLOBE, Y, CHECK, TANK, SAMPLING AND V-PORT VALVES
SCREWED, FLANGED AND WELDING FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

1309 WEST ELIZABETH AVE. • LINDEN, N. J.

sound an alarm, operate a recorder, or shut down the manufacturing process when flaws are encountered, and can be arranged to indicate when flaws exceed a given total. The control unit may be mounted remotely, where an operator can read the counter or watch for flashes of a flaw-indicating red light.

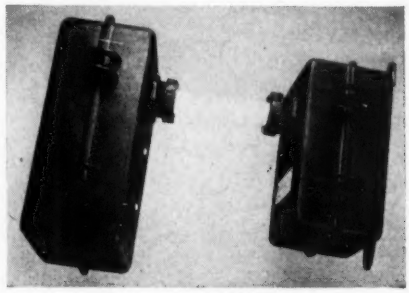
Fire Extinguisher QB 157

A new model fire extinguisher containing 5 pounds of fire-killing carbon dioxide in a recently developed light-weight cyl-

inder is under production by Walter Kidde & Company, Inc. The new portable replaces the old 4 pound type, giving an extra pound of carbon dioxide while knocking 2½ pounds off the average charged weight. The 4 pound portable weighed 18 pounds; whereas the new 5 pounder weighs but 15½ pounds.

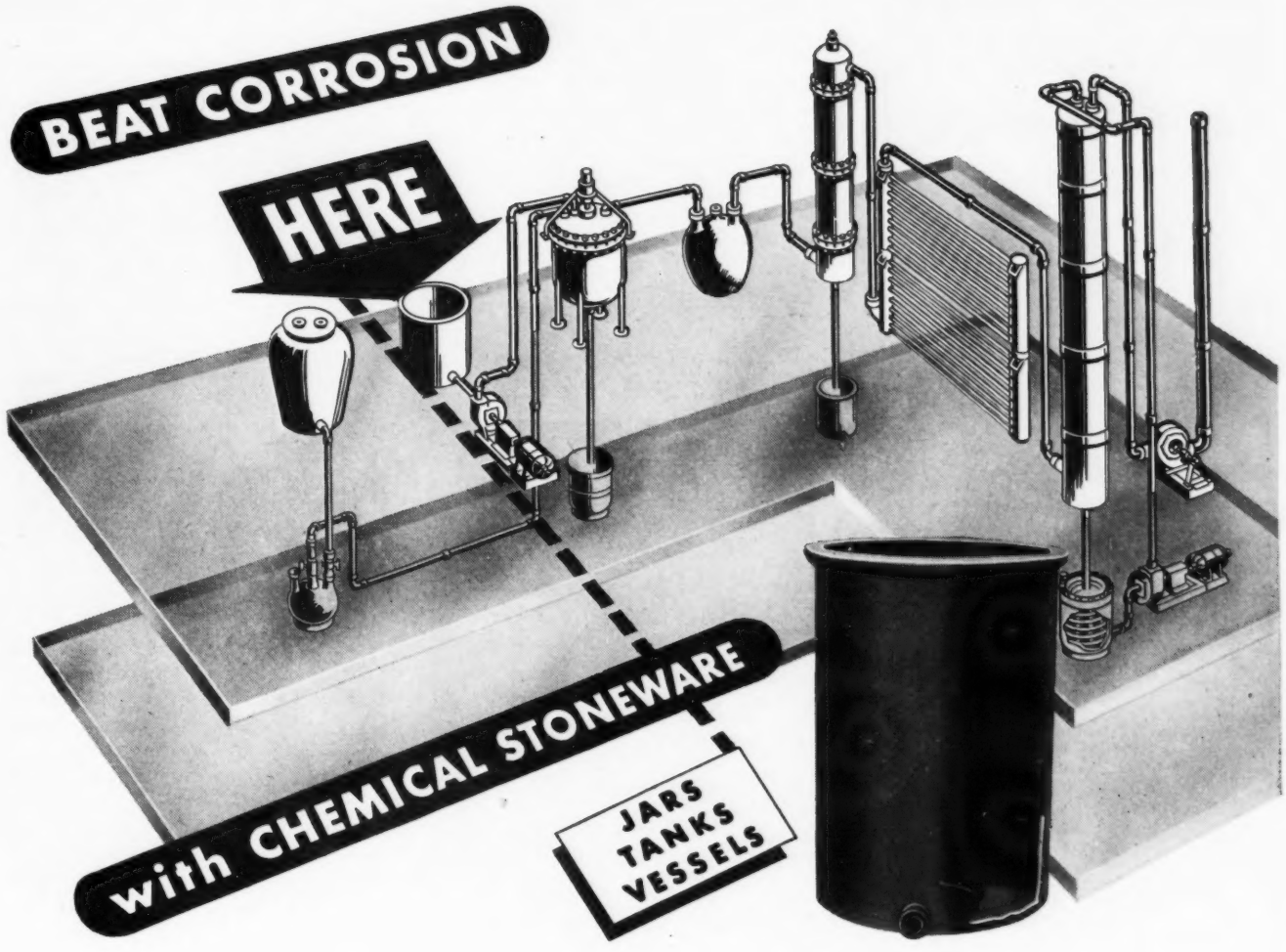
Smoke Indicator QB 158

Photoswitch photoelectric smoke indicator, Type A20C, indicates the density of smoke passing through the flue or



breaching of a heating or power plant, and signals when this density approaches the values prescribed by municipal smoke ordinances.

Type A20C basically consists of a photoelectric control and light source. These are mounted on opposite sides of the flue, and the light source beam is projected across the flue onto the photoelectric control. A sensitivity adjustment permits the



Corrosion-resistant storage problem in your plant layout? No problem at all with General Ceramics vessels, tanks and jars! Made of stone-hard chemical stoneware, they are not only corrosion-resistant, but—against all acids except hydrofluoric—actually *corrosion-proof*. They are designed for chemical plant service by chemical engineers—men who know the requirements of the chemical process industries.

In standard apparatus—or in equipment built to special requirements of size, applications and resistance to thermal shock – General Ceramics chemical stoneware will *beat corrosion best*.

WON'T CORRODE – Chemical stoneware is inherently corrosion-proof.

INTERCHANGEABLE – Materials stored in General Ceramics storage equipment can be changed with no danger of residual contamination.

EASY TO CLEAN – Materials will not cling to smooth chemical stoneware surfaces.

LONG LASTING – With normal care, chemical stoneware lasts indefinitely.

Send for bulletin 111 which describes standard storage equipment. On special design problems, send full particulars.

1819

GENERAL CERAMICS COMPANY
CHEMICAL STONEWARE

BUFFALO: 610 Jackson Bldg. **CHICAGO:** 20 N. Wacker Drive
LOS ANGELES: 415 So. Central Ave. **PORTLAND 5, ORE.:** 410 New Fliedner Bldg.
NEW YORK: 30 Broad Street • **SEATTLE:** 1411 Fourth Ave. • **SAN FRANCISCO:** 598 Monadnock Bldg.
TACOMA: 417 Tacoma Bldg.
MONTREAL: Canada Cement Bldg. • **TORONTO:** Richardson Agencies, Ltd., 454 King St., West
VANCOUVER, B.C.: Willard Equipment Ltd., 860 Beach Ave.

In addition to the manufacturing facilities of the Chemical Equipment Division those of the Insulator Division are also available for handling ceramic problems in all branches of industry. General Ceramics & Steatite Corporation is therefore able to offer service covering all industrial applications of ceramic products.

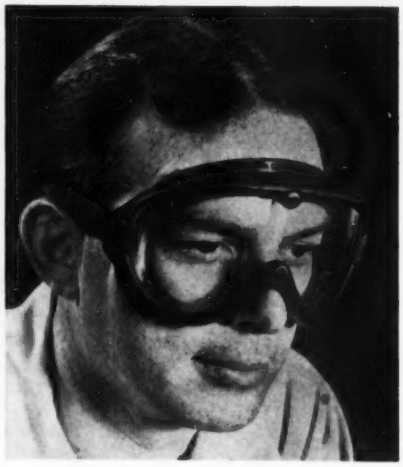
General Ceramics
AND STEATITE CORP.
CHEMICAL EQUIPMENT DIVISION
KEASBEY, NEW JERSEY

equipment to be set so that it will signal when smoke density approaches whatever value is prescribed as maximum by the local municipal smoke ordinance. It operates on 115 v. AC.

Supplementary equipment available includes bell alarms to signal excessive smoke, densometers to give continuous indications of smoke density and recorders to record the time of day at which excessive smoke passes through the stack.

Goggle QB 159

A new rubber-frame goggle equipped with a large, single acetate lens and specifically designed to protect workers



against chemical and dust hazards is announced by American Optical Co.

It is recommended for wear on jobs requiring handling of acids and caustics, it protects against chemical splashes, spray and impact of foreign particles, and exposures to fine dust concentrations.

The closely fitting face-form frame of the goggle is molded from non-irritating, acid-resisting synthetic rubber. Perforations at top and sides of goggle allow ample ventilation to reduce possibility of fogging.

The goggle is equipped with a large acetate single lens—slow burning and shatter-resistant—which is made to conform to high optical specifications for clear, undistorted, wide-angle vision.

Tachometer QB 160

A new switchboard tachometer Type 40E, having five heads and three speed ranges of the Metron Instrument Co., has permanently mounted tachometer heads at five different machines. The heads are wired to the central indicating unit by ordinary BX cable or conduit, where there is a rotary selector switch on the indicating unit to select the machine whose speed is to be measured.

The scale shows three separate speed ranges. These may be any range between 1 RPM full scale and 50,000 RPM full scale. A rotary selector switch, mounted on the panel of the indicating unit, selects the proper speed range.

Operating power is obtained from the commercial 115 volt AC power supply and accuracy and calibration are not affected by changes in line voltage between 105 volts and 125 volts.

The Tachometer head is a reversing

switch positively actuated in both directions by means of a cam mechanism. The tachometer shaft is the only rotating part. The reversing switch alternately charges and discharges a condenser through a milliameter causing the milliameter to deflect in direct proportion to the speed of rotation of the tachometer shaft. This tachometer contains no vacuum tubes or other limited-life components. Most models operate with an accuracy of 1 per cent at the extremely low torque of only 1/30 ounce-inch. These tachometers cannot be damaged by overspeeding or selecting a speed range while all tachometer heads are running.

Fire Extinguisher QB 161

Anybody can operate the new fire extinguisher of the Union Stop-Fire Corp. All the user has to do is point the flexible hose at the fire and give the readily

accessible valve a quick flick with the fingers, releasing an instantaneous stream of fluid.

The new extinguisher uses carbon dioxide combined with carbon tetrachloride. This is shot as a fine spray, extinguishing fires of the most stubborn kind—oil, ether, gasoline, electrical—in a matter of seconds.

The Stop-Fire extinguisher has a long range, the bulk of the stream traveling anywhere from 15 to 25 feet. The fluid

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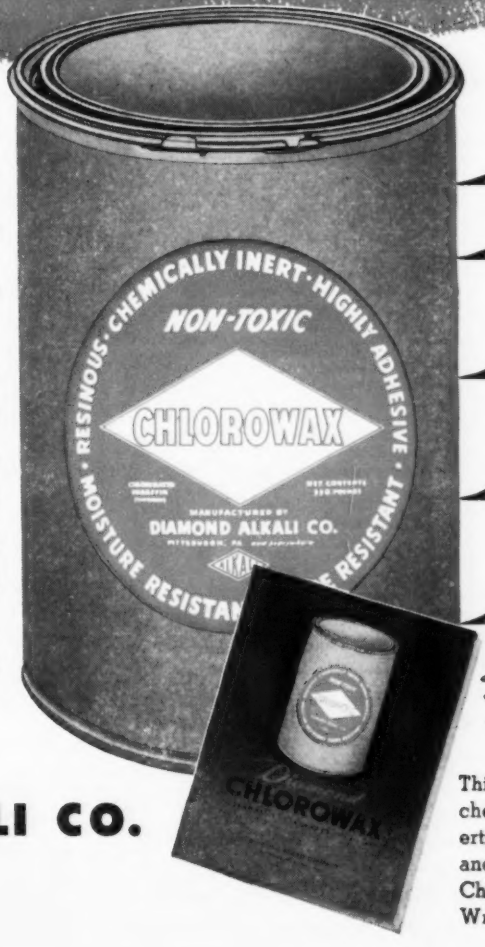
DIAMOND
CHLOROWAX
RESINOUS CHLORINATED PARAFFIN

Diamond Chlorowax gives a highly adhesive quality to interior and exterior paints —varnishes and lacquers—textile coatings —paper coatings—printing inks—glues and adhesives. It is widely compatible with resins, rubbers, vegetable oils and natural waxes, and improves moisture vapor resistance of some resins. Have you tried it in your formula?



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CONTENTS OF DRUM 250 LBS.

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This revised bulletin gives chemical and physical properties, solvents, compatibility and other pertinent data about Chlorowax and its many uses. Write for your copy today.

DIAMOND ALKALI CO.

PITTSBURGH 22, PA.

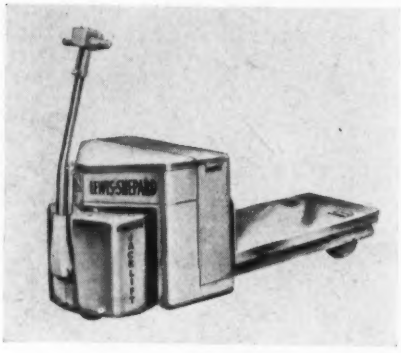
and Everywhere

is effective indefinitely, and the Stop-Fire tank does not have to be refilled, except when used. A pressure gage attached to the extinguisher indicates fluid pressure at all times. Stop-Fire stored-pressure extinguishers are manufactured of 85-15 brass, are non-corrosive, and there is no possibility of zinc oxidation.

Hand Lift Truck QB 162

Vertical handle operation and the electric brake are featured in Lewis-Shepard's new power Jacklift, built in both platform and pallet models.

The Jacklift is an electrically operated hand lift truck with complete operation



located in the handle head. Every operation of this speedy, powerful, rugged truck can be performed with the handle vertical. Let go the handle and immediately the electric brake will instantaneously stop the truck. In the vertical position or when lowered, the handle has a steering arc of 200°.

Hand Transfer Pump QB 163

The hand transfer, shallow-well pump of the Belco Industrial Equipment Division, Inc., will deliver 10 g.p.m. at normal cranking speed of 60 turns per minute and 15 g.p.m. at 90 turns per minute. Its rotor and shaft are supported on ball bearings which are sealed in grease and do not come in contact with the liquid being pumped. The plastic vanes are positively actuated and cannot bind or stick. Maintenance of prime is insured with a built-in check valve.

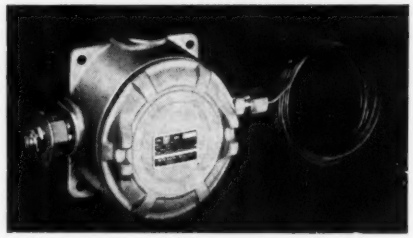
The unit will handle oils, kerosene, gasoline, fuel oil, alcohol, water, insecticides, turpentine and a variety of other liquids such as cider, syrup, etc. A specially constructed model handles corrosive liquids.

Folding Safety Spectacle QB 164

A new design in industrial eye-protection equipment was shown at the National Safety Congress by Watchemoket Optical Co. The semi-rimless type frame is hinged to fold at the bridge. A new type of hollow, stainless-steel temple telescopes to ⅓ normal length, and the entire goggle folds to the size of a pack of cigarettes. Lenses are of shatterproof Impax plastic, especially resistant to high-velocity impact. Clear or green-tinted lenses are instantly inter-changeable, and are locked in the deepchanneled Plexene plastic frame. The hinge between temple and frame will lock automatically in open position, and temples are available in 3 different lengths.

Explosion-Proof Thermostat QB 165

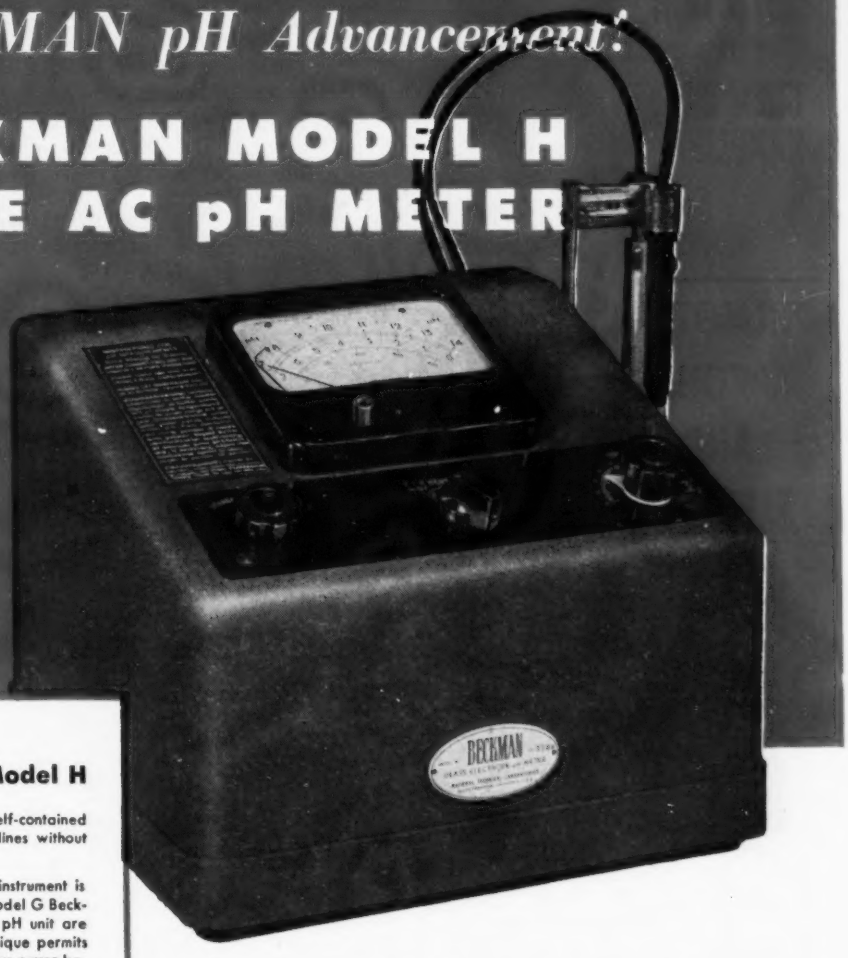
United Electric Controls Co., announces a new remote bulb thermostat designated the Type EJO. This new thermostat has an explosion-proof control, designed for



applications where dangerous dust and fumes are prevalent. All mechanism is located in an approved housing, the cover of which is threaded for easy removal for inspection or maintenance. This control may be mounted in any position on

Another BECKMAN pH Advancement!

THE BECKMAN MODEL H PORTABLE AC pH METER



Some Important Features of The Beckman Model H

Full AC Operation: The Model H is completely self-contained and operates directly from standard 115 volt AC lines without accessory equipment of any kind.

High Accuracy: The accuracy of the Model H instrument is equivalent to that of the well known Model M and Model G Beckman pH Meters. For rapid work, accuracies of 0.1 pH unit are easily obtained, and more careful attention to technique permits determinations to 0.02 pH units. Such high accuracy has never before been available in a compact AC pH Meter.

Single-Point Buffer Calibrations: With the Beckman Model H it is not necessary to calibrate with two buffer solutions. The Model H incorporates a unique electronic circuit that permits accurate readings regardless of variations in resistance of the glass electrodes due to aging or due to electrode temperature changes after calibrations. This important advantage is accomplished without need for multiple buffer calibrations.

Maximum Temperature Stability: After a short warm-up period, subsequent change in calibration of the instrument due to temperature effects is very small—only about 0.1 pH unit in the first two hours and 0.05 unit subsequently. When maximum accuracy is required, this change may be instantly checked and corrected *without rechecking against buffer solution.*

Full Temperature Compensation, 0 to 100° C: A built-in temperature compensator covering the full range of 0° to 100° C can be set to compensate automatically the effect of temperature changes on the EMF of the glass electrode over the entire pH range of the instrument. Thus, the pH at the electrode temperature may be read directly from the dial without calculation or corrections.

Direct Millivolt Scale: The Model H Meter is graduated in millivolts as well as pH units, and a range switch permits measuring directly either in millivolts or pH at will.

Rugged Lightweight Construction: The Model H is housed in a cast aluminum case with an attractive dark gray wrinkle finish. The instrument weighs approximately 10 pounds, complete, and is easily carried. For maximum operating convenience the meter dial and all controls are mounted on a sloping panel.

The First Portable AC pH Meter with DC Accuracy, Simplicity and Dependability

NO LONGER need you sacrifice accuracy and dependability to get the convenience of AC operation in a portable pH Meter. For now the same organization that pioneered modern glass electrode pH equipment, and has pioneered every major advancement in modern pH instrumentation and methods, brings another important development... a portable pH Meter that operates from standard AC current *without sacrificing any of the accuracy and dependability that are so essential in modern pH applications.*

This new instrument – the Beckman Model H pH Meter – has been in development over a long period of time. Many different designs and circuits were tested and rejected before an instrument was perfected that meets the rigid Beckman standards of excellence. The Model H Meter is not just an "AC" pH Meter. It is an instrument embodying advancements in circuit design that insure the same high operating efficiency and accuracy that have made Beckman pH Equipment standard throughout the world.

A few of the many unique features incorporated into the Beckman Model H pH Meter are outlined at right. Contact your nearest distributor of Beckman pH Instruments for further details... or write direct. *Beckman Instruments, National Technical Laboratories, South Pasadena 17, California.*

BECKMAN

INSTRUMENTS CONTROL MODERN INDUSTRIES

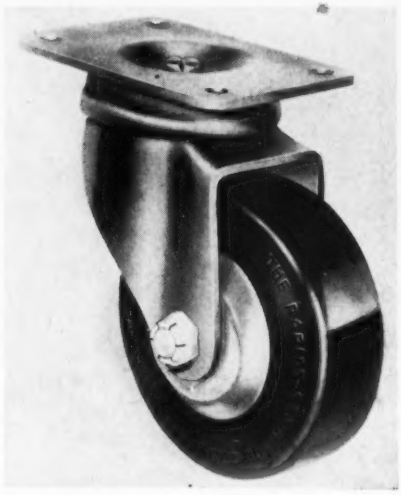
a flat surface and the housing is tapped, ready for installation of electrical connections.

The Type EJO has an external calibrated adjustment with 120° F or 250° F range in models covering -120° F to 600° F. Four remote bulb styles are available. Electric ratings are as follows. AC 1200 watts, 115-230 volts non-inductive, and AC 300 watts, 115-230 volts inductive.

Steel Caster QB 166

A new caster named the "Scout", the first of a formed steel No. 33 series designed for light and medium duty service, has been added to the caster line of the Rapids-Standard Company, Inc.

The top plate of the new caster is of popular dimensions and swivel yoke and



is formed from ⅛″ steel. A double ball race assembly provides free-swiveling action under rated load capacities and in a wide range of operating conditions and applications.

Freedom from dirt interference is assured by a deep drawn upper raceway swivel bearing cup design, which covers and protects the ball race.

The caster is manufactured in swivel and rigid models and may be equipped with either hard or soft tread molded-rubber Rapids-Standard 3½ inch wheels.

The caster's top plate size is 2½ inches by 3⅝ inches with bolt holes for ¼ inch bolts at 1¾ inch by 2⅞ inch center to center spacing. Overall height of the new caster is 4$^{11}/_{16}$ inches.

Capacities of the Scout caster are tested recommendations for a caster of this wheel size. Equipped with either of two different wheels the caster has a capacity load rating varying from 125 lbs. to 250 lbs.

Crystal Oscillator QB 167

The new midget quartz crystal oscillator for controlling the frequency of dielectric heating and other similar installations of North American Philips Company, Inc., measures less than ⅝″ in diameter and less than 1¼″ in length. This tiny quartz crystal assembly can be mounted much the same as a radio resistor. At each end is a pin-type terminal which is tinned for quick soldering into the circuit.

Frequency of the new Philips midget crystal oscillator is fixed to coincide with values assigned by the F.C.C. for dielectric heating apparatus.

Fork Truck QB 168

The Sky Lift of the Automatic Transportation Co., a new telescopic, tilting, hydraulic lift electric fork truck features

the highest lift ever achieved on a fork truck of standard 83-inch collapsed height. At the same time it is capable of tiering to ceiling heights in boxcars and low-clearance buildings.

Its lift of 130 inches is fully ten inches higher than any other hydraulic truck, yet the Sky Lift will pass through a regular seven-foot door when collapsed.

One new feature of the Sky Lift is the pneumatic controller—known as the Newmatic — which operates as the electric counterpart of an automobile gearshift. This eliminates tire slippage, enables even acceleration, and reduces the peak load on the electrical system by two-thirds. When the accelerator is depressed, the Newmatic controller starts the truck in first speed and automatically passes through the faster speeds.

The Sky Lift's controls, including only two foot pedals, steering wheel and two levers, also closely parallel automobile controls. Brake pedal and foot accelerator are both identical to those of a car. The two levers—one controlling both tilt and lift and the other forward-reverse direction—are just below the steering wheel, similar to the steering column gearshift on newer model cars.

Pipe Line Viewer QB 169

Jacoby-Tarbox Corp., announces a new design Series 4000. These range in sizes from ½″ I.P.S. to 1″ They are available

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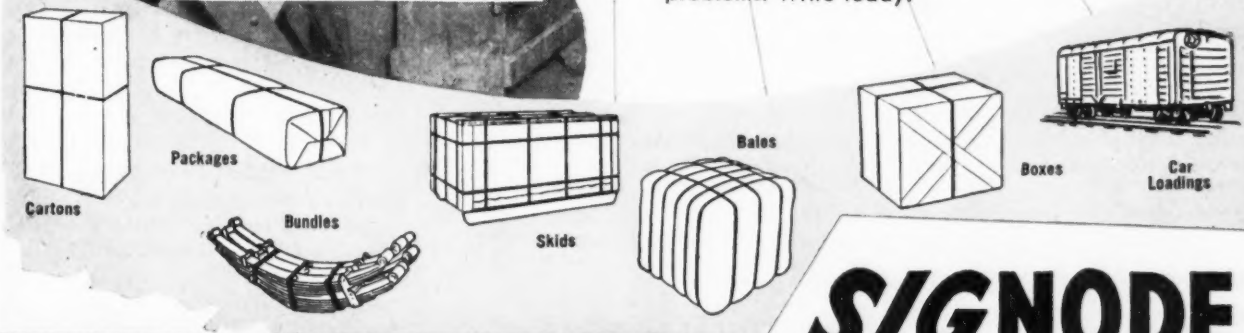
You can depend on Signode Steel Strapping to give maximum protection to goods in transit from cartons and small boxes to heavy palletized units and carloads.

Forty-one branch offices—in eight major shipping areas—provide fast, nation-wide service on tools, steel strapping and seals—the basic elements in Signode's complete system of PLANNED PROTECTION for all types of shipping containers. The Signode SYSTEM cuts transit damage and helps to reduce shipping room expense.

Why not check its possible application to your own products? A Signode engineer will gladly offer specific suggestions in terms of your own packing and stowing problems. Write today!



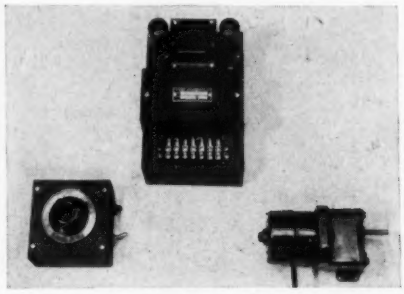
SIGNODE
STEEL STRAPPING

SIGNODE STEEL STRAPPING CO.
2662 North Western Avenue, Chicago 47, Illinois
395 Furman St., Brooklyn 2, N. Y. • 481 Bryant St., San Francisco 7, Calif.

for iron, brass or stainless steel pipe lines, and are constructed for safe operating pressures up to 200 pounds p.s.i. The glass is Pyrex on all standard fittings.

Servo Control QB 170

The accuracy of the new remote positioning servo control of Yardeny Laboratories, Inc., is better than 1 per cent of the full range. The Synchro-Link is an



inexpensive packaged unit with two adjustments. They are a sensitivity control, permitting adjustment of the accuracy or dead zone and anti-hunting (anticipating) control for adapting the characteristics of the system to the different value of inertia of the motor and loads in various applications. Once set, these controls do not require any attention or adjustment.

The Synchro-Link works on the principle of the self-balancing electronic bridge. It will handle 15 amp., 110V, AC or 10 amp. 220V, AC, using any reversible motor.

Interesting Patents

SAFETY EQUIPMENT. Making composition capable of liberating oxygen upon contact with exhaled air comprises providing intimate dry mixture of alkali metal peroxide and minor proportion of dry solid acidic substance, heating mixture, producing hard, bonded, porous mass of peroxide containing alkali metal salt of acidic substance. No. 2,405,566. David Feigley, Jr., to Mine Safety Appliances Co.

MAKING ALKALI METAL OXIDE comprises spraying molten alkali metal into current of atmosphere containing oxygen and gas inert to metal, oxidizing metal, supplying atmosphere to provide excess of oxygen. No. 2,405,580. Carey Jackson to Mine Safety Appliances Co.

"PEBBLE BED" furnace "pebble bed" comprising tubular shaft, supporting grating, stratified series of transverse beds of refractory filling, including centrally disposed bed of large refractory objects and beds immediately above and below the centrally disposed bed of small refractory objects, shaft and filling so constructed as to provide open spaces above filling and below grate, etc. No. 2,408,282. Frank Wolf to Wisconsin Alumni Research Foundation.

HEEKIN CANS

With Harmonized Colors

THE HEEKIN CAN COMPANY, CINCINNATI, O.

UFACTURER OF LITHOGRAPHED CANS SINCE 1901

PACKAGING & SHIPPING

by T. PAT CALLAHAN

Materials Handling Exposition

THE FIRST National Materials Handling Exposition, in conjunction with the first Conference on Materials Handling, was held in the Public Auditorium at Cleveland, Ohio, from January 14 to January 17, attracting over 10,000 registrants.

The reason for holding such an exposition and conference is best explained by the introduction appearing in the official program, which reads in part as follows:

"Materials handling has authoritatively been estimated as accounting for 22 per cent of the average plant payroll. As such, it represents today one of industry's major problems—and probably the single most promising possibility for cost reduction.

"Out of mounting recognition of the ramified significance of materials handling in industry grew the National Materials Handling Exposition and the concurrent Conference on Materials Handling. For it was recognized that a massive attack on the problem—through the dramatic medium of the exposition and the exchange of information by outstanding experts—represented the most fruitful possibilities for industry to control and reduce this staggering charge against its operations."

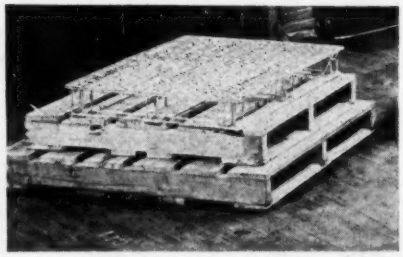
The exposition covered two floors of the auditorium, on which were displayed the greatest assemblage of materials handling equipment which has ever been shown at one time. All forms of manual and power-operated equipment was shown and demonstrated, and in addition to these were the products of over one hundred of the country's leading manufacturers of the latest developments in pallets, conveyors, and other handling equipment.

Summarized in the program were "Principles of Materials Handling," embodying outstanding information which should be considered in planning and operating a materials handling system. They are reprinted here for the benefit of firms in the chemical industry.

Principles of Materials Handling

Planning Your Handling System

1. Make up your mind to get the best system possible. Do not be satisfied that your present system is the best until you have thoroughly checked every aspect of it.
2. Look at your materials handling system as a machine, each part of which must gear with all other parts. A bad system plus some new equipment will still equal a bad system.
3. Select equipment on the basis of operational needs. Get the facts on such factors as facilities and the type of merchandise you handle. Remember your system must be geared to these factors.
4. Get the facts on new equipment. Find out the kind and quantity of work each machine will do for you.
5. Get the facts on cost of new equipment. Be sure to take account of depreciation, maintenance, fuel or power costs, installation or changeover costs, costs of supplementary equipment needed, etc. Keep records in both dollars and man-hours so you know what your present costs are. Have equipment manufacturers or salesmen give you estimates on depreciation, maintenance, and fuel or power costs for their equipment.
6. Do not buy more equipment than you need. Estimate your needs carefully.
7. Do not buy power and capacity you do not need. Know what you want a machine to do and what it will do.
8. Plan to use power equipment where you can. Machine power is usually cheaper than manpower. Let men direct power, not generate it.
9. Plan to handle materials in large units. Unit handling costs generally decline as load size increases.
10. Plan your system so that you can avoid rehandling your merchandise.
11. Choose equipment which moves supplies rapidly.
12. Choose equipment which can do several things. The more flexible your equipment, the easier it will be to keep your machines busy.
13. Be sure your system is not hazardous to personnel.
14. Be sure your system is not hazardous to property.
15. Keep your system simple. Use as few types and models of machines as possible. This simplifies training and helps to keep machines busy. It will also keep down maintenance costs and limit necessary supplies of spare parts.
16. Let gravity work for you.
17. The heavier the work the men have to do, the sooner they will slow down. Let machines do the back-breaking jobs.
18. Avoid dead weight, particularly in hand operated equipment. The lighter a truck is, the easier it will be for your men to push it.
19. Watch equipment details. Get automatic couplers, rubber tires, etc.
20. Get rid of outmoded equipment.
21. Use cubic space. Get equipment which will permit high stacking.
22. Get equipment which will permit fast shifting of merchandise in rewarehousing to get larger blocks of space.
23. Reduce storage space just as little as possible.
24. Check your system periodically. Watch



Among pallet types shown were wooden, metal, steel mesh and expendable paperboard. One company leases pallets rather than selling them outright.

General view of the materials handling show at Cleveland, January 14-17.

A FRANK STATEMENT

OF WHY AMERICAN CAN COMPANY MUST ALLOCATE METAL CONTAINERS

★

Steel for plate making still in short supply. As Government relaxes control on uses of steel, Canco must allocate its output to protect you.

★

WHEN THE Government removed its restrictions on steel for plate making, it became necessary for American Can Company to step in and set up its own system of allocation . . .

. . . despite the fact that Canco has adequate production facilities.

Now, why was this move necessary?

It's a matter of steel. Steel for making plate. The steel plate from which all types of cans and containers and other metal packages are made.

For all types of steel are still in short supply! There just isn't enough of it to fill *all* the needs of *everybody*.

So, it seemed to us that the only fair thing to do was to see to it that every one of our customers got his just and proper share of steel plate . . . the little fellow . . . the big fellow . . . and all those users of steel plate in between . . . all on the same basis.

And until this situation eases, we are continuing our policy of accepting no new business. Your Canco salesman is prepared to explain to you our 1947 allocation plan . . . how it applies to you. And how it protects you. We invite you to discuss this matter with him.

AMERICAN CAN COMPANY

CANCO

NEW YORK ★ CHICAGO ★ SAN FRANCISCO

new equipment. Watch changes in type and amount of business you do.

Operating Your Handling System

1. Plan your operations. Hold daily planning conferences.
2. Avoid idle time.
3. Control men and equipment from a central point.
4. Balance men and machines. Always assign enough men—but never too many—to work with each machine. Equipment, not men, sets the pace in mechanical operations.
5. Standardize on the best method for each operation. Prepare written procedures for recurring operations.
6. Move materials in a straight line.
7. Provide adequate and regular preventive maintenance for your equipment.
8. Train personnel, especially operators, in proper use of equipment.
9. Keep your floors clean and in good condition.

Tinplate Shortage Remains Serious

The chemical industry uses a great amount of tin plate for the fabrication of containers, and the following release from the Civilian Production Administration is indicative of the serious shortage which exists and the outlook for the future. The Civilian Production Administration released the following information:

Pointing out that United States imports of tin from the Far East during the first nine months of 1946 amounted to 2,474 tons, only about 5 per cent of the pre-war average, the CPA indicated today that distribution controls on the metal should be maintained until imports from this source brought supply more closely in relation to demand.

In pre-war days, the Orient accounted for almost 75 per cent of tin output, CPA said.

Lack of skilled labor, equipment and consumer goods accounted for the small output in the first three quarters of last year, the agency said, indicating that production would be slow in returning to normal.

In a report on the U. S. tin position covering this nine-month period, CPA disclosed that tin imports from all sources amounted to 38,512 tons compared with 32,022 tons during the same period in 1945. Bolivia continued its war-attained position as the principal U. S. supplier.

Total 1946 and 1947 tin supplies will be bolstered by a "windfall" of 10,000 tons of tin from Japan, of which 5,316 tons have already arrived here. The report said that this tin from Japan—after weighing, sorting and analysis—will be distributed among all countries represented on the Combined Tin Committee.

Tin consumption in the United States, according to the report, dropped to 59,005 tons compared wth 66,564 tons in the similar 1945 period. This decline largely reflected work stoppages in the steel and automobile industries early in 1946, together with cancellation of war contracts.

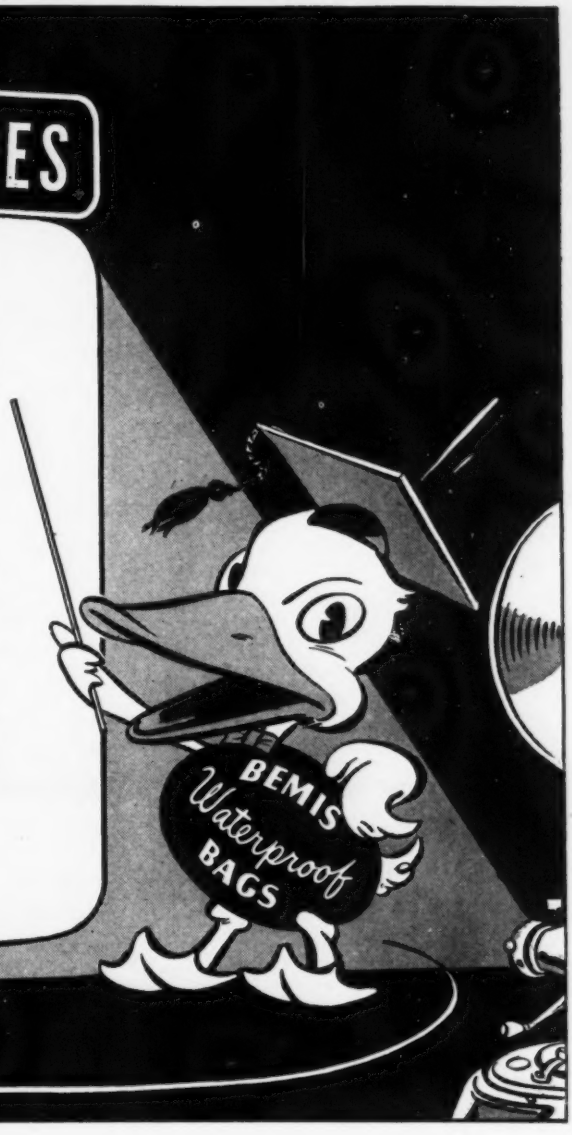
Despite this drop in 1946 demand, imports of 38,512 tons and secondary tin recoveries of 17,861 tons were insufficient to meet the demand and government stocks were depleted by 5,394 tons.

The 3¾-ton truck shown at the show handles eight full drums on pallets.

The electric hand truck is built both in platform and pallet models.

The Towmotor Unloader eliminates manual unloading of forks or pallets.

BEMIS MINUTE MOVIES



for Shippers who want to save time and money

"The Salvation of Mr. Useful"

Scenario: Mr. Useful, a well-known chemical has an important job—absorbing moisture. But he overdid it. Being so thirsty, he often reached work pretty well "loaded."

Question: how to keep our hero away from drink until he reaches the job. Obvious answer: a moistureproof container. But, here's the hitch: the container must be low cost. So . . .

Happy Ending: Mr. Useful now goes to work in Bemis Waterproof Laminated Textile Bags. His weakness is controlled. He arrives in fine shape . . . does a good job . . . and saves money.

PRE-TESTS STOP PROTESTS! Bemis Waterproof Laminated Textile Bags head off complaints because they are tested *before* they are put to work. Their strength and tear-resistant, puncture-resistant qualities are pre-proved for you. And their economy is attested by thousands of users.

This Bemis Waterproof Bag is light in weight, yet is the strongest shipping bag made. It assures low-cost protection against sifting, breakage, change in moisture content, escape or absorption of odors, and many other common shipping complaints. A Bemis Waterproof Bag can also be made acid-, oil-, or grease-resistant. It's ideal for LCL and export shipments. Empty or filled, it saves storage space.

If the *exact* Waterproof Bag you need doesn't exist, the Bemis Shipping Research Laboratory will design it for you.

Write today for a copy of "Seven Facts About Low-Cost Protective Packaging"

BEMIS BRO. BAG CO.

WATERPROOF DEPARTMENT

408-J PINE STREET — ST. LOUIS 2, MISSOURI

Plants and Offices in 33 Principal Cities

PLANT OPERATIONS NOTEBOOK

As long as the supply lasts readers may obtain copies of "A.S.M.E. Standard Automatic Control Terminology," reprinted from the last few issues of Chemical Industries.

How a Pipe Still Was Used as a Steam Generator

THE rapid expansion of the facilities for the manufacture of 100-octane gasoline during the War period necessitated added steam generating capacity at the Baltimore refinery of the Standard Oil Co. of N. J. The concurrent need for the maximum possible quantity of 100-octane fuel and the protracted delivery dates on steam generating equipment caused arrangements to be made in 1943 for the conversion of an existing vacuum pipe still, which formerly manufactured asphalt, into a steam generator.

Sufficient capacity was available at that time in an atmospheric pipe still to satisfy the asphalt manufacturing requirements, temporarily permitting the release of the vacuum pipe still from this service.

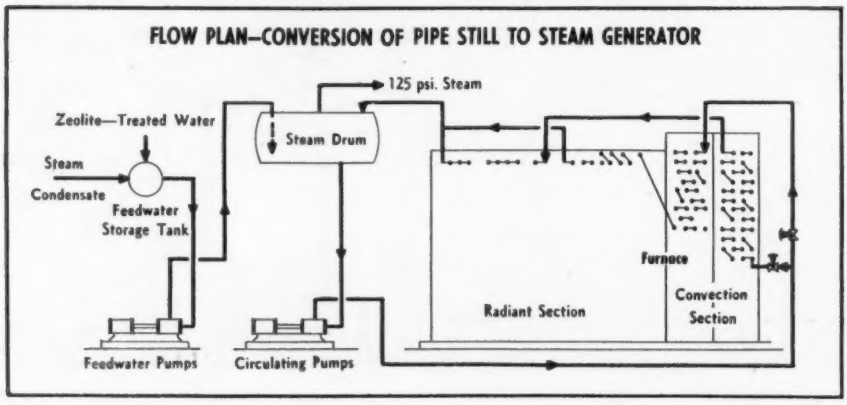
The revamped unit was designed for a generating capacity of 40,000 lbs. of steam per hour at 150 psi. Available equipment was utilized in its reconstruction and the remodeled facilities consisted of the existing pipe still furnace, a reconditioned cracking coil soaking drum installed horizontally near the furnace to serve as the steam drum, small feedwater storage tank and four existing pumps for feedwater and recirculating service.

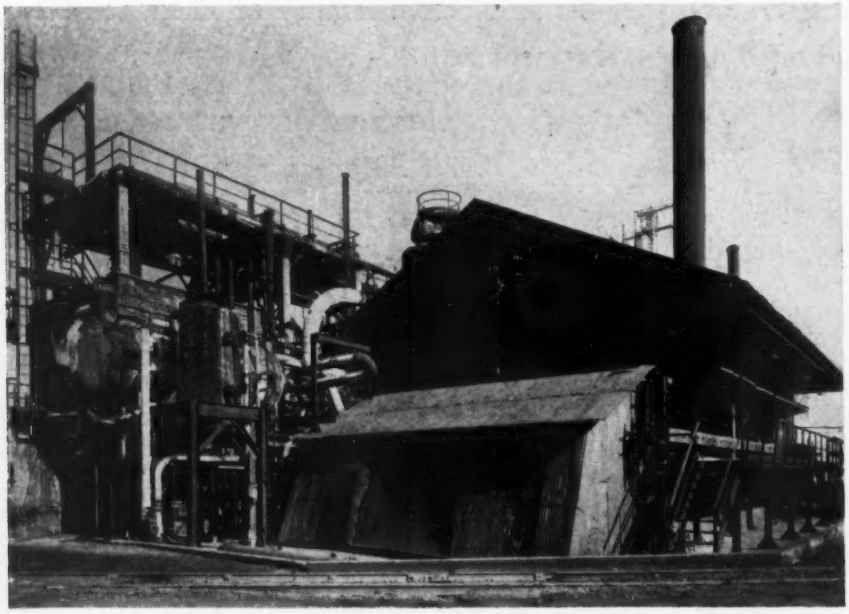
When used as a pipe still the oil feed traversed a long series path through the furnace tubes. However, when operating as a steam producer, the water was split into two parallel runs to decrease pressure drop. Even so, forced feed recirculation of the water through the tubes at 250 psi was necessary.

In operation, zeolite-treated feedwater from a boiler plant plus steam condensate is delivered to the storage drum from where it is pumped into the steam drum. Circulating pumps took suction from the steam drum and passed the feedwater in split streams through the tubular furnace back to the steam drum. A recirculation ratio of about four to one on the quantity of water fed to the unit was found necessary in order to secure satisfactory operation. Most of the former fuel burning system was utilized, permitting the furnace to be fired with refinery gas and fuel oil.

This unconventional design did not satisfy the requirements of the A. S. M. E. Boiler Code but approval for the operation of the unit for the duration of the War was received from the State Boiler Inspection authorities after they had been convinced of the exigencies of the situation.

The unit was placed in service on Feb. 23, 1944, carrying an average base load of 35,000 lbs. of steam per hour. It continued in satisfactory operation other than a couple of repair periods until April 14, 1945 when it was finally removed from service.





Pipe still at the Baltimore, Maryland, refinery of the Standard Oil Co. of N. J., which served for over a year as a steam generator. Although partially dismantled, the steam drum can be seen in the left foreground, the furnace being located in the small building at the right.

Trichlorethylene

A sectional committee of the American Standards Association after a three-year study has concluded that concentrations of trichlorethylene exceeding 200 parts in one million parts of air were dangerous to workers, according to a report approved by the Standards Council of the Association.

These data have been made available by the American Standards Association as an American Standard covering the safely permissible concentration of this widely-employed degreasing agent.

Correction

Certain symbols were omitted and transported from equation (3), appearing with "The Water Flow Nomograph" on pg. 1062 of the December, 1946 issue.

The equation appeared as

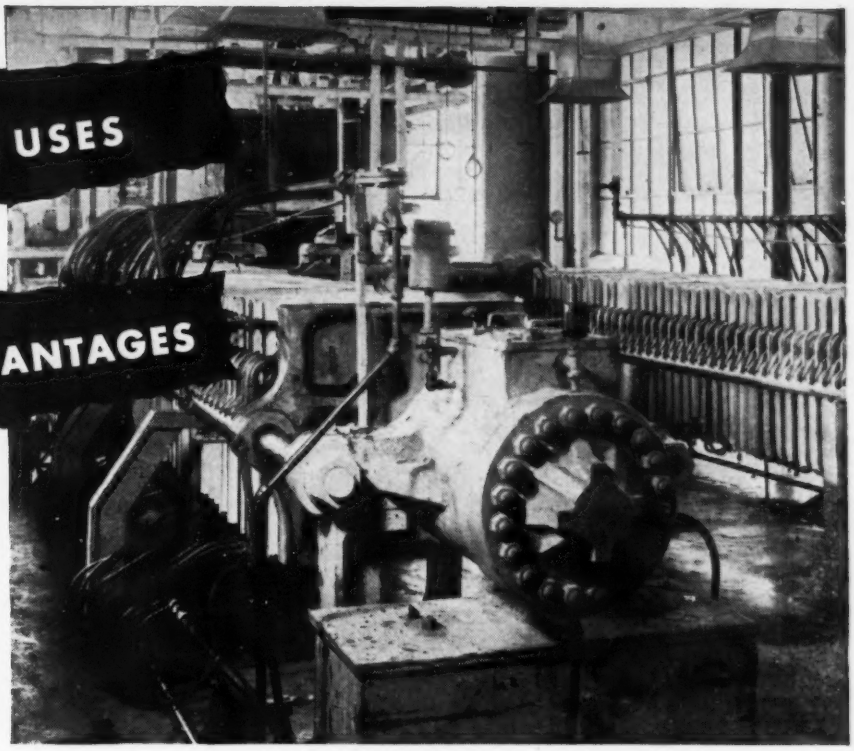
$$\Delta P_{1000} = 53.9 \left[0.0035 + 0.00895 \left(\frac{d}{Q}\right)^{0.42} \frac{Q^2}{d^5} \right] \qquad (3)$$

whereas it should have read

$$\Delta P_{1000} = 53.9 \left[0.0035 + 0.00895 \left(\frac{d}{Q}\right)^{0.42} \right] \frac{Q^2}{d^5}$$

FOR MULTIPLE USES

FOR MULTIPLE ADVANTAGES



Sperry PLATE FILTER PRESSES

There are many reasons — sound reasons — for the increasingly wide use of the Sperry Plate Filter Press. Industry has found that this filter press offers special advantages which increase the efficiency and reduce the cost of filtration.

One of the foremost is its versatility. The Sperry Plate Filter Press will handle any kind of filterable mixture, including viscous substances. It can perform low, medium or high pressure filtration. It can use wire, wool, asbestos, glass, vinyon, filter paper, pulp and virtually all types of filter cloths. The simplest type of filter cloth can be used — in fact the cloth can be cut direct from the roll. Cloths are easily removed and replaced.

Advantageous, too, is the simple construction of the Sperry Plate Filter Press. This means that its first cost is low, and that maintenance and operating expenses are kept to a minimum. It also assures ease of operation.

The Sperry Plate Filter Press can be used with precise temperature control. It can be used to separate emulsions. It will handle hot liquors without vaporizing. It will filter without exposing the liquid to the atmosphere.

If you have a filtration problem, why not discuss it with Sperry engineers? We invite you to submit samples of your material for a complete analysis, we will then give unbiased recommendations . . . all without obligation.

FREE . . . Valuable data and charts on industrial filtration in this booklet. Write Sperry for your copy — today!

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Filtration Engineers for Over 50 Years

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NOMOGRAPH-OF-THE-MONTH

Edited by DALE S. DAVIS

Line Coordinate Charts For Caustic Soda Solutions

*by D. S. DAVIS**

Wyandotte Chemicals Corp., Wyandotte, Michigan

Chemical Industries will be happy to receive any charts that you may have developed so that they may be shared with your fellow engineers. The authors of each chart used will receive ***an honorarium of $10.***

The accompanying nomographs, based on well known data (2), enable convenient and accurate calculation of the percentage sodium hydroxide content of caustic soda solutions when the hydrometer readings and temperatures are known. The charts are of the line coordinate type and are predicated on the linearity, over the range of 0 to 100° C., of functions of the hydrometer reading, δ, with certain functions of the percentage concentration, C, according to the equations

$$\delta = a + b\,C \quad \text{(for 1 to 12 per cent caustic soda)}$$

$$\delta\left(\frac{\delta - 1}{22} + 1\right) = g + h\,C \quad \text{(for 10 to 32 per cent caustic soda)}$$

$$\delta = m + n[C - 0.0033(C - 40)^2 + 0.33] \quad \text{(for 30 to 50 per cent caustic soda)}$$

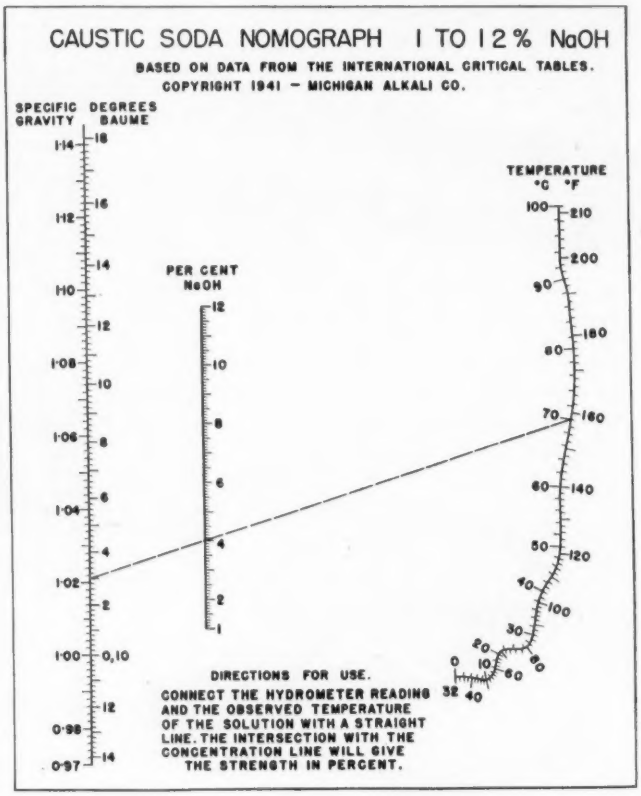
where a, b, g, h, m, and n depend upon the temperature but need not be defined analytically.

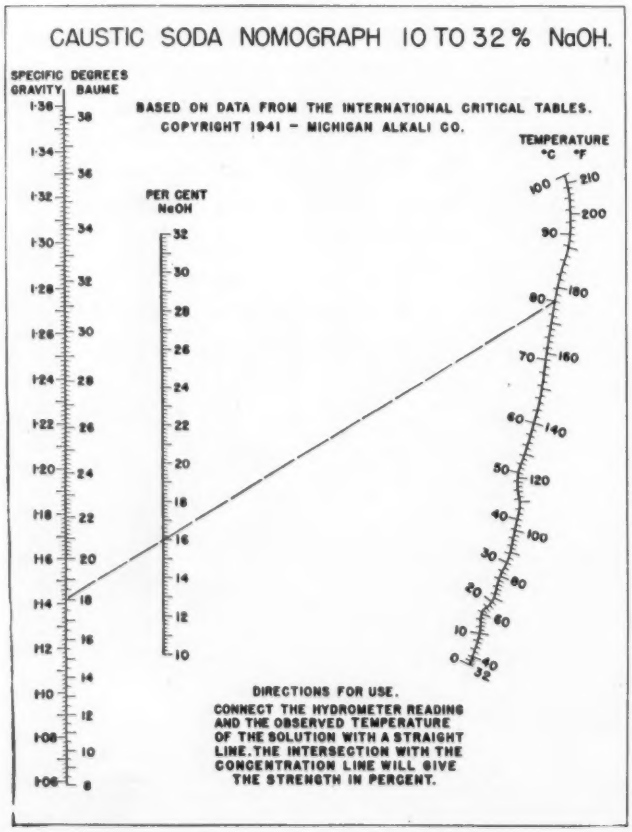
The charts, constructed by methods described previously[1], bear doubly graduated hydrometer reading and temperature axes; the former are scaled in specific gravity and Baumé units and the latter carry Centigrade and Fahrenheit scales. A straight line connecting the hydrometer reading and the observed temperature will intersect the central scale in the percentage of caustic soda.

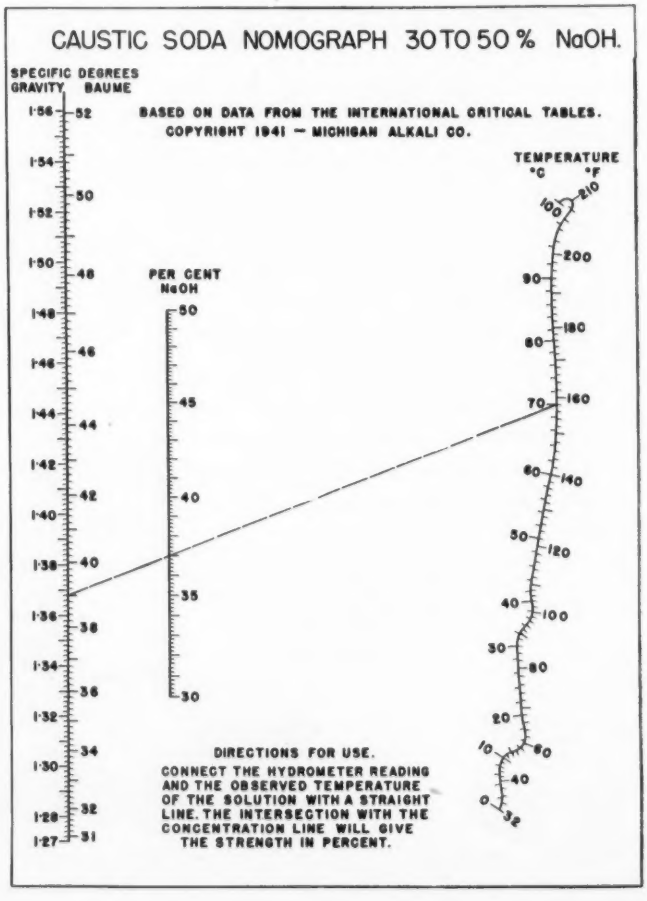
* Present address: Tallmadge, Ohio.

Literature Cited

(1) Davis, D. S., "Empirical Equations and Nomography," p. 140, New York, McGraw-Hill Book Co., 1943.
(2) International Critical Tables, 3, p. 79, New York, McGraw-Hill Book Co., 1926.







It's in . . .

mother's magazine

Johnny's cookie

doctor's gloves

Calcium Carbonate. And quite possibly it's Wyandotte Precipitated Calcium Carbonate.

Wyandotte Precipitated Calcium Carbonate, as a pigment, makes possible high-grade *coated paper.*

This chemical is increasingly in demand by makers of *baking powder* for its calcium-enrichment properties.

Wyandotte Precipitated Calcium Carbonate is the best reinforcing agent known for many *rubber* products—lending tensile strength and tear resistance to rubber goods, including gloves, hospital sheeting and hot-water bottles . . .

This versatile product has many other uses in such diverse fields as plastics, dentifrices, polishes and pharmaceuticals . . .

If you have a food-enriching, pigmenting, mild abrasive, reinforcing or extension problem, Wyandotte Chemicals Corporation invites you to consult them about the adaptability of Wyandotte Precipitated Calcium Carbonate to your purposes.

Wyandotte
REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine
Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

LABORATORY NOTEBOOK

Electric Furnace

A new electric furnace, which it is said offers a performance unusual for a furnace of its size and moderate cost, has been announced by the Thermo Electric Mfg. Co., of Dubuque, Iowa. Known as the Model CEA, this new furnace offers wide utility for general laboratory use.

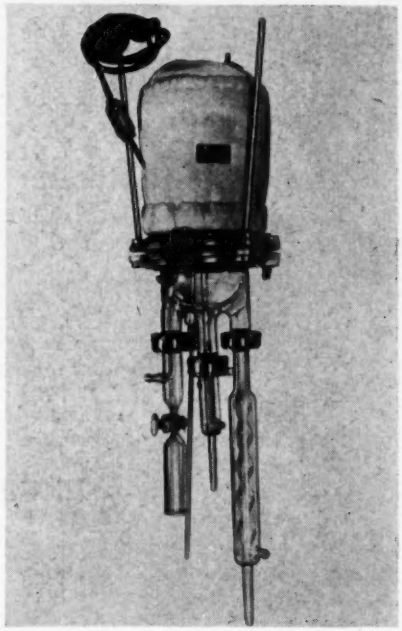
The heating chamber measures 4¾" wide, 4¼" high and 6" deep, with overall dimensions of 12" wide, 15½" high and 14½" deep. The furnace will maintain a temperature of 2000° F. continuously, and automatically hold any selected temperature from 500° F. to 2000° F. The manufacturer also emphasizes the fast heating of this model—up to 1500° F. in 30 minutes.

Construction features one-piece aluminum castings for the body and door. The counterbalanced door is hinged to swing forward, and thus provides a handy loading platform. Insulation is cast permanently in place inside the furnace body. The heating element completely surrounds the chamber to assure uniform distribution of heat. An indicating pyrometer shows muffle temperature, and is calibrated in both Fahrenheit and Centigrade scales.

The Model CEA is available for use on either A. C. or D. C. current, either 115 or 230 volts. Complete information can be obtained by writing to the Thermo Electric Manufacturing Co., 480 W. Locust St., Dubuque, Iowa.

Special Mantle for Resin Flasks

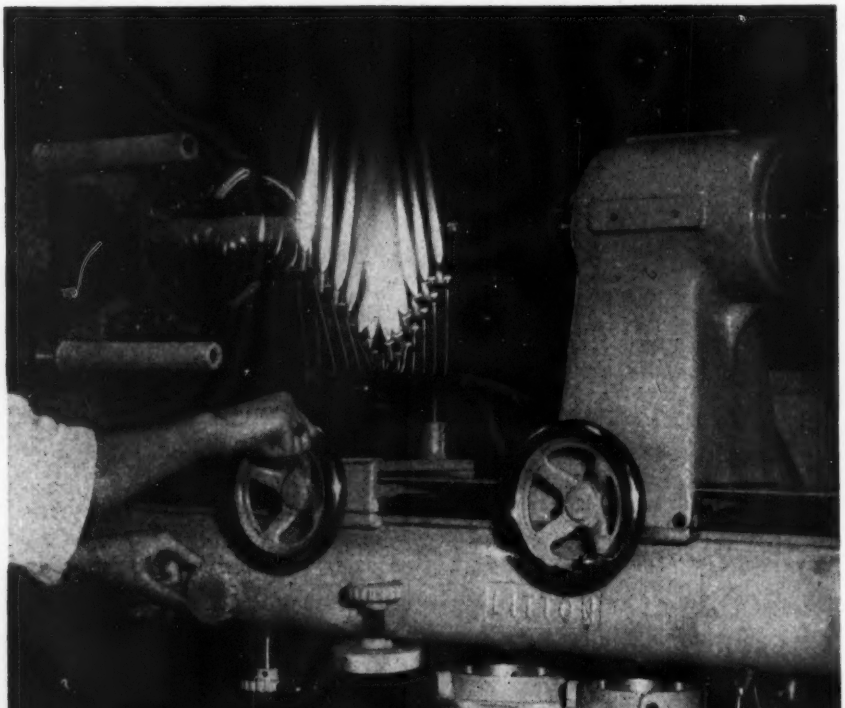
A new heating mantle designed to fit resin reaction flasks has been announced by Glas-Col Apparatus Company, Terre Haute, Indiana. These mantles are manufactured for resin reaction flasks in sizes ranging from 500 to 3000 milliliter capacity. Since they provide even heat distribution, they act to prevent scorching of clear organic materials and give



a controlled method of applying heat of any temperature.

Since resin reaction flasks now available to laboratories are not of a standard size, the company manufactures these mantles on order to fit the flask on which it is to be used.

Glass-Blowing Machine



A new addition to Hercules Experiment Station's equipment is a mechanical glassblower lathe which by the use of pedals, levers, wheels and compressed air turns out intricate pieces of glass with only manual or foot assistance from the operator. The machine is produced by the Litton Engineering Laboratories in Redwood City, California. The lathe has different size chucks for holding the glass, and the twelve-burner flame is on a track which can be adjusted to meet the glassware at the proper spot. A valve controls the burner and is operated by the foot. A valve also supplies the proper mixture of gas and oxygen and another valve determines in which direction (head or footstock) the air for blowing is to be used.

pH Indicator

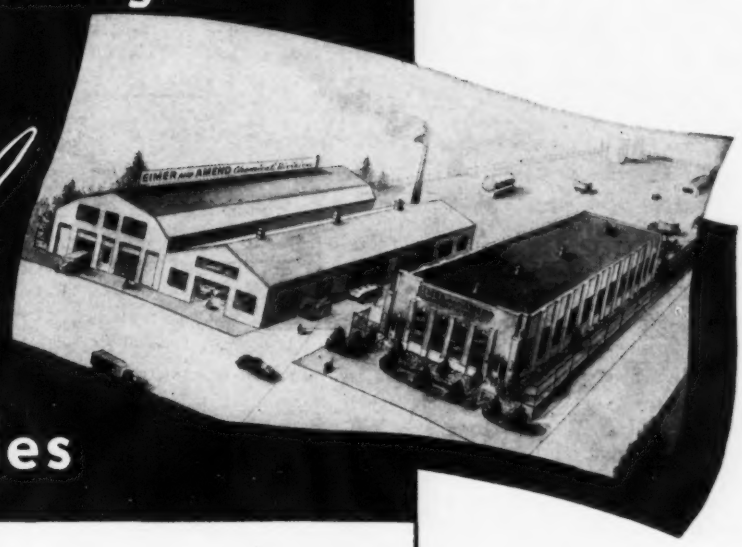
To overcome the lack of color sensitivity of usual indicators, a new, sharp endpoint indicator, known as TruTest M-E-P Indicator, has been developed which meets all the requirements of pH control and is so easy to use and so constant and sharp in color separations that even untrained laboratory personnel can use it with quick accuracy. This indicator changes from green on the alkaline side to an intermediate gray to a definite purple on the acid side, or vice versa. The gray tint provides a convenient warning of the approaching endpoint.

The sensitivity of TruTest M-E-P Indicator is demonstrated by the fact that one drop of N/10 acid will carry 25 ml. of sodium bicarbonate solution from a green color to the warning gray color. A second drop will turn the solution to the ultimate purple endpoint. In unbuffered solutions, one drop of N/10 acid or alkaline will carry the color from green to purple or vice versa.

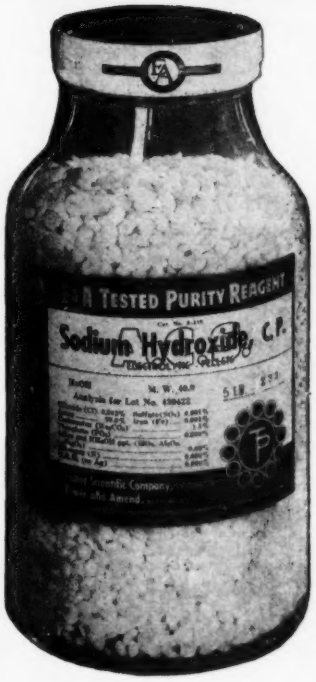
TruTest M-E-P is a stable, aqueous solution, containing no alcohol or other volatile liquids. Its effectiveness is not impaired by organic matter or phosphates in solution. It is manufactured by TruTest Laboratories, Inc., 261-263 S. Third St., Philadelphia 6, Pa.

EIMER and AMEND · · has *Increased* facilities for manufacturing

fine Chemicals in Large Quantities



Eimer and Amend's chemical manufacturing plant at Edgewater, N. J.



E.&A. Tested Purity Reagents were the first in America to bear labels stating exact analysis. They meet A. C. S. specifications.

The modern facilities maintained by Eimer and Amend for furnishing fine chemicals in large quantities are at the command of America's chemical industry.

Inquiries should be directed to the company's New York plant where a well-qualified technical staff will cooperate.

- Inorganics
- Organics
- Solutions
- Special · · formulas

E&A

95 years of technical "KNOW HOW" at your command

EIMER AND AMEND

Manufacturing Chemists

635 Greenwich Street • New York 14, New York

INDUSTRY'S BOOKSHELF

X-Ray Diffraction

THEORY OF X-RAY DIFFRACTION IN CRYSTALS, *by W. H. Zachariasen.* John Wiley and Sons, Inc., N. Y., 1945. iv + 255 pp. Illustr. Reviewed by W. L. Kehl, Gulf Research and Development Co.

THIS IS a book written primarily for the more serious student of X-ray diffraction. The author attempts to present a logical treatment of both the theory of crystal symmetry and the theory of X-ray diffraction in crystals. The treatment is entirely theoretical in nature, with no discussion of experimental techniques and only a few rather brief sections devoted to comparison between theory and experimental results. Mathematical elegance and conciseness have been attained by the use of vector and tensor equations and representations throughout the book. This feature is very attractive to the reader who is trained to read and think in terms of vectors and tensors. However, there are many people working in the field of X-ray diffraction who would be interested in the material contained in this book, but who are not sufficiently familiar with vector and tensor relations to be able to read this material except with great difficulty. These people will not find the book too useful.

It should be made clear that this is a valuable book in that it presents important material of a very fundamental nature, much of which is not readily available elsewhere, if available at all. As a text book, it would provide excellent training for the more mature, serious student in X-ray diffraction who would go through the book very carefully and thoroughly, filling in all the missing steps and checking the equations derived. Since this is usually not practicable for a great many potential readers, the usefulness of the book is considerably limited. The reviewer would like to see an attempt made to present as much of the material as possible in a form more suitable to the average reader, so that a greater number of workers in the field could enjoy the benefits of the anthor's efforts.

Metal Soaps

THE ALKALINE-EARTH AND HEAVY-METAL SOAPS, *by Stanley B. Elliott.* Reinhold Publishing Corp., New York, 1946. 345 pp.; $7.50. Reviewed by C. A. Weltman, Alox Corporation.

THIS IS the first book of its kind to present in a condensed and usable form existing information on the manufacture and applications of alkaline earth and heavy metal soaps. It is a well organized presentation of the varied and scattered information revealed in the patent and technical publications. The book is designed for the industrial chemist and only briefly discusses theoretical aspects of the subject. The author has done well by eliminating all of the contradictory and confusing theorizing which has appeared from time to time in the literature, and has only briefly outlined such theories as are generally accepted.

About half of the book deals with the practical considerations involved in the precipitation and fusion methods of preparing soaps of the alkaline earth and heavy metals. All the pertinent information about most of the widely used raw materials, their advantages and disadvantages for specific uses, and their source and relative cost are included. A discussion of the classification of soaps on the basis of (1) the physical characteristics of the soap, (2) the ability of the soap to influence the characteristics of the liquids in which it is dispersed, and (3) the ability of the soap to dissolve in certain organic solvents and supply metal cations, is given in some detail. Since so little fundamental information is available, this classification based on the uses of metal soaps is very instructive.

The last half of the book deals with a description of the individual soaps of commercial importance in terms of the classification mentioned above. Considerable useful information about the uses of soaps for greases, wetting and dispersing agents, pigment dispersers and wetters, catalysts, fungicides, detergents, emulsifiers, lubricants, cosmetics and pharmaceuticals is included. The appendix contains an extensive compilation of references to the patent literature, soap specifications, tabulated applications of soaps, and physical properties of soaps.

The usefulness of this book lies in its presentation and organization of much of present day information on soap technology. It will be a valuable asset to the industrial chemist interested in applications of metal soaps, and to those who believe soaps may someday assume even greater industrial importance.

Other Publications

LITERATURE SEARCH ON THE PRESERVATION OF FOOD BY FREEZING, by B. H. Weil and Frances Sterne. This well-indexed listing of abstracts of 2095 literature articles and patents, both foreign and U. S., should be of great value to those working in this increasingly important field. Special Report No. 23 of the State Engineering Experiment Station, Georgia School of Technology, Atlanta, Georgia, June, 1946. Price $4.00.

PHARMACY'S PART IN SOCIETY entitles an account by George Urdang of what pharmacy's place and part in society has been through the ages, and of the tasks which the profession has met and is meeting. It is published at $5 by the American Institute of the History of Pharmacy, Chemistry Bldg., Madison, Wis.

REGULATION OF THE SECURITY MARKETS is the title and subject of a Brookings Institution publication which will be of interest to management. Price, $2, from the Institution, 722 Jackson Place, Washington 6, D. C.

EXTRACTIVES FROM NORTHEASTERN WOODS is the subject of Bulletin 9 of the Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn. It includes a review of the literature and accounts of commercial extraction of essential oils from wood. Price, $1.

NATIONAL INTEREST AND INTERNATIONAL CARTELS, by Chas. R. Whittlesey, Prof. of Finance and Economics at U. of Penn., deals with the cartel problem in relation to patents and foreign trade in addition to the more fundamental relationship with a free economy. MacMillan Co., New York, $2.50.

SPHERICAL TRIGONOMETRY AFTER THE CESARO METHOD, by J. D. H. Donnay, ties together the concepts of spherical and plane trigonometry. It is said to be useful to chemists concerned with crystallography. Price, $1.75, Interscience Publishers, Inc., New York.

PHOSPHATES AND SUPERPHOSPHATE, by A. N. Gray, compiles world-wide statistical information together with descriptive information on the phosphate industry. 416 pages, $7. Interscience Publishers, Inc., New York 3, N. Y.

ANNUAL REPORTS of the Society of Chemical Industry on the Progress of Applied Chemistry (1944) are now available. Literature of 26 fields of the chemical industry is ably reviewed. Price, $4.80, Society of Chemical Industry, 56, Victoria St., London, S. W. 1.

WOOD YEAST FOR ANIMAL FEED is Bulletin 12 of the Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn. The feed value of wood yeast and its production are discussed in two parts in the 198-page bulletin. Price, $2.

CHEMISTRY AS A PROFESSION, and a similar one on CHEMICAL ENGINEERING are booklets published by the National Roster of Scientific and Specialized Personnel to outline employment requirements and opportunities for vocational guidance. Copies are 10¢ each. Supt. of Documents, G. P. O., Washington 25, D. C.

PLASTICS IN PRACTICE, by John Sasso and Michael A. Brown, Jr., is a 185-page book reviewing plastics in all their successful commercial applications for readers concerned with product development, design and merchandising. McGraw-Hill Book Co., Inc., N. Y. Price, $4.

A. S. T. M. METHODS CHEMICAL ANALYSIS OF METALS replaces the 1943 edition, price, $4.50. Also published are the A. S. T. M. STANDARDS 1945 SUPPLEMENT in three volumes, $4 per volume. A. S. T. M. Headquarters, 1916 Race St., Philadelphia, Pa.

RESEARCH IN HOLLAND is the general title of a series of monographs published by the Elsevier Publishing Co., New York. To date 24 titles have been published, among which are "MODERN DEVELOPMENT OF CHEMOTHERAPY," $3.50, and "CONTRIBUTION TO THE PHYSICS OF CELLULOSE FIBRES," $4.

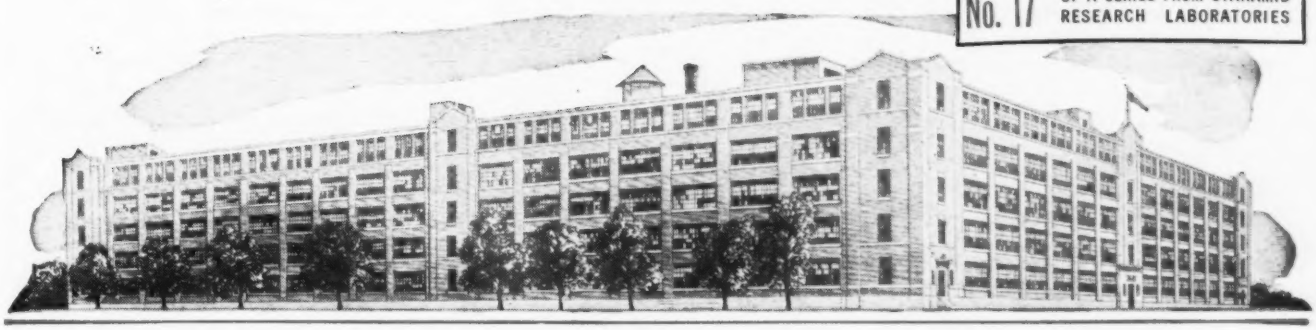
INDUSTRIAL FILMS—A SOURCE OF OCCUPATIONAL INFORMATION is a booklet published by the USES to acquaint persons required to know facts about jobs and industries with the value of films in presenting those facts. The films describe 18 industries. Excellent for personnel directors, teachers and vocational guidance counselors. Copies are 20¢, Supt. of Documents, G. P. O., Washington 25, D. C.

HEAT TREATING ALUMINUM ALLOYS is a 114-page, well illustrated book presenting considerable detail on the subject, published by Reynolds Metal Co., Dept. 47, 2500 S. 3rd St., Louisville 1, Ky. Price, $1.

STATISTICAL ABSTRACT OF THE UNITED STATES 1946 contains 1039 pages. Price, $2.25, Supt. of Documents, G. P. O., Washington 25, D. C.

PROCEEDINGS OF THE MEXICAN-AMERICAN CONFERENCE ON INDUSTRIAL RESEARCH have been published by the conference sponsors, Armour Research Foundation, Technology Center, Chicago 16, Ill. The volume contains papers by more than a score of this country's leading scientists. Price, $2.50. Send orders to S. Charles Pappageorge at the above address.

WHERE TO FIND INFORMATION ON THE GERMAN CHEMICAL INDUSTRY is a well indexed bibliography prepared by L. Wilson Greene, former colonel of the General Staff Corps. It contains 344 references to periodicals and OPB reports. Price, $1, Harford Printing & Publishing Co., Aberdeen, Md.



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Purity	99%
Form	White, crystalline material
Solubility	Sol. water, MeOH, liquid ammonia Sl. Sol. EtOH, Acetone V. Sl. Sol. Ether, Benzene
Decomp. point	207–9°C

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BOOKLETS & CATALOGS

Chemicals

B156. ARMEEN SALTS. "Armeen Salts —Penetrants . . . Repellents," 4 pgs. Armour Chemical Div., Armour and Co.

B157. BENZENE HEXACHLORIDE is the subject of a new technical bulletin of John Powell & Co., Inc.

B158. COLOR. "Color in Electromagnetic Energy," folder, Sun Chemical Corp.

B159. CRACKING CATALYST. "Aerocat Grade MS-A Synthetic Fluid Cracking Catalyst," 8 pgs., American Cyanamid Co.

B160. FINE CHEMICALS. Price List, Mann Fine Chemicals, Inc.

B161. METAL CASTING SEALANT. The use of Laminac resin as a sealant for porous metal castings is discussed in a recent bulletin from the Plastics Division of the American Cyanamid Co.

B162. NICKEL PLATING. "For Best Results Plan to Use Harshaw Modified Bright Nickel Process," 16 pgs., Harshaw Chemical Co.

B163. P-DI-TERT-BUTYLBENZENE. 12 pages, circular No. 104. Chemical Products Dept., Standard Oil Co. (Indiana).

B164. PLASTICS MATERIALS TABLE, 1 pg., Shaw Insulator Co.

B165. SANITATION. The B-K Sales Division of the Pennsylvania Salt Mfg. Co. has revised its 8-page color leaflet on sanitation and its 6-page color leaflet on bacteria control for dairy equipment.

B166. SOLVENTS. "Solvents, Alcohols, Extenders," 64 pgs., third edition, CP Chemical Solvents Inc.

B167. SYNTHETIC RUBBER. "Five Years of Synthetic Rubber" titles a 50-page bulletin which is available from the United States Rubber Co.

B168. VARNISH RESIN. "Nevillac RT," 7 pgs., Neville Co.

B169. VOLUMETRIC STANDARDS. "How to Make Standard Volumetric Solutions in a Few Minutes," 4 pgs., The Emile Greiner Co.

Equipment

G109. ACID AND ALKALI RESISTANT PUMPS. 20 pgs., Bulletin W-350-B1H, Worthington Pump and Machinery Corp.

G110. AUTOMATIC CHEMICAL FEED SYSTEMS. "Electronics in Automatic Chemical Feed Systems," 14 pgs., Technical Paper No. 54, Milton Roy Co.

G111. AXIAL-FLOW BLOWERS. "Moore Direct Drive Axial-Flow Pressure Blowers," 12 pgs., The Moore Co.

G112. BAG LOADER. "New Flexoveyor," 4 pgs., Bulletin No. 100, E. C. Horne Machinery Co.

G113. BELT CONVEYOR. "Rapid Power Boosters," 32-pgs., Catalog No. 31-C5, Rapids-Standard Co., Inc.

G114. CARBON MONOXIDE ALARM. "M.S.A. Carbon Monoxide Alarm Industrial Type," 4 pgs., Bulletin No. DR-3, Mine Safety Appliances Co.

G115. CHECK VALVE. "The Williams-Hager Flanged Silent Check Valve," 4 pgs., The Williams Gauge Co.

G116. CONSTRUCTION DATA. A. C. Horn Co., Inc. has issued a new 96-page edition of their construction data and handbook.

G117. CORROSION-RESISTING PROCESS EQUIPMENT. 20 pgs., general catalog H, The Duriron Co., Inc.

G118. CRUSHERS. "Jeffrey Double Roll Crushers," 8 pgs., Bulletin No. 794, The Jeffrey Mfg. Co.

G119. DEGREASERS. "D'Oiler for Better and More Efficient Cleaning of Metal Parts and Pieces!", 8 pgs., Mechanical Process Co.

G120. DENSITOMETER. "Direct Reading Photoelectric Densitometers," 4 pgs., L J. Long Co.

G121. DILATOMETER. "A New Type of Recording Dilatometer," 6 pgs., Electronics Division, Sylvania Electric Products, Inc.

G122. DUST COLLECTORS. 16 pgs., Bulletin No. 101, Peters-Dalton Inc.

G123. ELECTROFLUID DRIVE "Why Link-Belt Engineers Created the Electrofluid Drive Packaged Power Unit for You!", 15 pgs., No. 2085. Link Belt Co.

G124. FAN. "Durco Corrosion Resisting Fans," 12 pgs., Bulletin No. 1102, Duriron Co., Inc.

G125. FEEDERS. 12 pgs., catalog No. 33-D, Hardinge Co, Inc.

G126. FIRE HOSE. "Firemen Can Work Faster with B. F. Goodrich Hose," 6 pgs., B. F. Goodrich Co.

G127. FLOOR MAINTENANCE is the subject of Bulletin No. 603 titled "Cut Floor Maintenance" of Walter Maguire Co.

G128. GAUGES AND DIAL THERMOMETERS. 20 pgs., Jas. P. Marsh Corp.

G129. HEAD PROTECTION. "M.S.A. Skullguards, Industry's Best Head Protection, 4 pgs., Bulletin No. DK-13, Mine Safety Appliances Co.

G130. HEATING SYSTEM. "The Blaw-Knox Electro-Vapor Heating System," 8 pgs., Bulletin No. 2083, Blaw-Knox Co.

G131. HIGH VACUUM RECORDING AND

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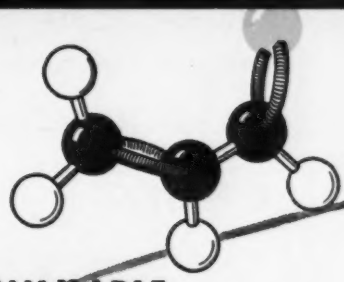

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Amination $CH_2=CH-CHO + (CH_3)_2NH \longrightarrow (H_3C)_2N-CH_2-CH=CH-N(CH_3)_2$ (1,3-DIMETHYLAMINOPROPENE)

Ring Formation $CH_2=CH-CHO + CH_2=CH-CH=CH_2 \longrightarrow$ (TETRAHYDROBENZALDEHYDE)

$CH_2=CH-CHO + NH_3 \longrightarrow$ (β-PICOLINE)

PROPERTIES	
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Molecular weight	56.06
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Boiling point	52.7° C
Colorless	
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Soluble in alcohol, ether	

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G132. HOSE MASKS. "M.S.A. Hose Masks with the M.S.A. 'All Vision' Facepiece," 6 pgs., Bulletin No. EB-5, Mine Safety Appliances Co.

G133. INDUSTRIAL PROTECTIVE CLOTHING. "B. F. Goodrich Industrial Protective Clothing," Catalog Section 12000, B. F. Goodrich Co.

G134. INSULATIONS. "Our Third Report to Industry on Simplex Synthetic Rubber Insulations," 12 pgs., Simplex Wire and Cable Co.

G135. MATERIALS HANDLING EQUIPMENT. 6 pgs., Metzgar Co.

G136. NEEDLE VALVES. "Kerotest Steel Needle Valves," 4 pgs., Kerotest Mfg. Co.

G137. PETROLEUM PRODUCTS. "Sun 'Job-Proved' Products for Industry," 4 pgs., Sun Oil Co., Industrial Products Dept.

G138. POWER. "More power to U. S. A." titles a 32-page book available from Allis-Chalmers Mfg. Co.

G139. POWER TRANSMISSION AND CONVEYORS are the subjects of a new general catalog of the Patron Transmission Co.

G140. REMOTE TRANSMISSION is the subject of a recent 24-page catalog (No. 5902) of the Brown Instrument Co.

G141. RUBBER LINING. The Vulcalock rubber to metal bond is the subject of catalog section 9000 now available from the B. F. Goodrich Co.

G142. SAND BLAST HOSE. The B. F. Goodrich Co. has issued a 1-page catalog section (No. 4440) concerning their sand blast hose.

G143. STAINLESS STEEL PIPE AND FITTINGS. John B. Astell and Co., Inc. has issued a 4-page folder describing and picturing their line of pipe, tubing and fittings.

G144. STATIC ELECTRICITY. "Controlling Static Electricity on Belts 'DAG' Colloidal Graphite" titles a recent 4-page bulletin (No. 140.1) of Acheson Colloids Corp.

G145. STEAM GENERATOR. The Cyclotherm fluid-fired steam generators are the subjects of a recent 4-page bulletin.

G146. STEEL LUBRICATED PLUG VALVES are the subjects of a 16-page catalog (No. S-46) recently issued by American Car and Foundry Co.

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NEWS OF THE MONTH

Chemical Industry Takes Firm Stand Against Tariff Cuts

FEW industries are more tariff-conscious than the chemical industry, and few have more reason to be. And, last month, with the full realization that foreign producers may soon become serious competitors of U. S. chemical manufacturers, representatives of leading chemical producers expressed their definite opposition to tariff cuts.

Both the Manufacturing Chemists' Association and the Synthetic Organic Chemical Manufacturers Association filed briefs before the government Committee for Reciprocity Information, as did the Soap and Glycerine Producers, Lead Industries Association, and a number of other groups and individual corporations. The reason: trade agreement negotiations are to be conducted by the State Department with 18 nations in April.

Cited by the briefs was the record of the chemical industry during the war, made possible by the fact that by 1939 the U. S. had huge chemical producing facilities. And such was far from the case in 1917, when, partly as a result ot fhe then ineffective tariff provisions, the U. S. was largely dependent on foreign chemical sources. In 1922, Congress, aware of the essentiality of a domestic chemical industry, revised the Chemical Schedule and adopted a more or less paternalistic attitude toward the industry. By 1930 the provisions of the 1922 Act had been reenacted and extended. Such protection fostered the pre-war growth of the industry.

The MCA, in particular, pointed out that a high wage level and a satisfactory standard of living cannot be maintained if the U. S. producers are subjected to foreign low-wage competition. Wages and salaries, according to MCA, represented 27.8 per cent of the sales dollar in 1938, and amount to more than 30 per cent now. Today the average hourly wage rate in the U. S. chemical industry stands at $1.26. In Great Britain it approximates 42 cents, with Italy, Germany, France, and Switzerland all running considerably below the British figure.

Also to be considered is the fact that the efficiency of chemical industries in Great Britain, Switzerland, Holland and Belgium does not differ materially from that of the U. S. (France and Italy are somewhat less efficient). These strong, well-organized industries are moving rapidly into production. Foreign wage rates are lower; production costs can be pared.

Another factor of concern is the rapid expansion of Russia's State-monopolized chemical industry, and the acquisition by Russia of facilities in the German zone and in satellite countries.

Moreover, wherever central or socialistic governments control output, commodities can be priced for export to the U. S. at any figure necessary to move the goods. And political considerations may weigh heavier than purely economic.

In essence, the testimony revealed, any further reduction in chemical tariff rates to the credit of foreign nations whose economies are geared to substantially lower standards of living, and to political concepts which do not permit competition on an equal basis, will place the U. S. industry in a seriously disadvantageous position. Production and productive capacity, number of workers employed, and research appropriations would be reduced. The future of the industry would be imperiled.

The basic contention is that this is not the time for chemical tariff revisions. The military security of the U. S. and its peacetime economy could be placed in jeopardy. There is a high degree of uncertainty as to future costs of U. S. chemical production, and current foreign costs are not obtainable.

In the light of such considerations the formulation of proper tariff rates borders on the impossible.

Russia's Interest in Physics

Th: U. S. S. R. has more subscribers than any other foreign country to American technical journals in the field of physics, according to an analysis of subscription lists of the eight journals published by the American Institute of Physics.

Foreign subscriptions represent 23 percent of the total. England ranks a close second to Russia in number of subscribers.

Polymer Research Unit Extended

Just two years after its founding as one of the country's first centers for polymer work, the Institute of Polymer Research in the South Building of Polytechnic Institute of Brooklyn has outgrown its original quarters and has been forced to move to larger laboratories, Herman F. Mark, head of polymer research reports.

The new headquarters is at 81 Willoughby St. and encompasses nearly double the floor space of the former quarters. Included are four large laboratories and one small one. The new arrangement makes possible closer coordination among the scientists conducting research projects.

Power Advanced by Atlas

James T. Power, appointed director of development by Atlas Powder Co., Wilmington. He will continue to direct sales research activities which he has headed since 1943.

Farben's Acetic Acid Process

An acetylene-methanol process developed by the Germans to improve the quality of acetic acid for cellulose films is described in a report (PB-40121) now on sale by the Office of Technical Services, Department of Commerce.

The process is based on the reaction of acetylene with methanol under pressure to give vinyl methyl ether, which is then hydrolyzed to give acetaldehyde and methanol, the latter being recycled. It is claimed that the process is simpler than the mercury-catalyst Schopau process, obviating poisoning and recovery of the catalyst, and eliminating mercury impurities in acetic acid which show up as blemishes in cellulose ester films.

Although production before the war was on a limited scale in the Ludwigshafen research plant of I. G. Farbenindustrie, plans had been made for a new plant with a capacity for 170 tons per day of acetaldehyde.

Daily output of the proposed plant called for handling 96,600 cubic meters of acetylene, from which 264 tons of crude

vinyl methyl ether and 163.5 tons of methanol would be produced. On an experimental basis, the yield of vinyl methyl ether from acetylene was 97 percent, and the saponification stage to acetaldehyde was achieved with a 99 percent yield.

CALENDAR *of* EVENTS

AMERICAN CHEMICAL SOCIETY, joint meeting, Presentation of Nichols Medal, New York City, March 7.
AMERICAN CHEMICAL SOCIETY, 111th national meeting, Atlantic City, N. J., April 14-18.
AMERICAN GAS ASSOCIATION, A. G. A. Sales Conference, Copley Plaza Hotel, Boston, Mass., March 17-19.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, summer meeting, Montreal, Quebec, Canada, June 9-13.
AMERICAN INSTITUTE OF MINING and *METALLURGICAL ENGINEERS*, 75th anniversary, Waldorf-Astoria Hotel, New York City, March 17-19.
AMERICAN MANAGEMENT ASSOCIATION, Annual Packaging Exposition, Convention Hall, Philadelphia, Pa., April 8-11.
AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION, annual meeting, Boca Raton Hotel, Boca Raton, Fla., April 28-30.
AMERICAN SOCIETY FOR TESTING MATERIALS, 50th annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 16-20.
CHEMICAL INSTITUTE OF CANADA, annual conference, Banff, Alberta, Canada, June 8-11.
DRUG, CHEMICAL and *ALLIED TRADES SECTION, NEW YORK BOARD OF TRADE*, 21st annual dinner meeting, Waldorf-Astoria, New York City, March 13.
ELECTROCHEMICAL SOCIETY, Spring Congress, Hotel Brown, Louisville, Ky., April 9-12.
NATIONAL ASSOCIATION OF CORROSION ENGINEERS, annual convention and exhibition, Palmer House, Chicago, Ill., April 7-10.
NATIONAL ASSOCIATION OF INSECTICIDE and *DISINFECTANT MANUFACTURERS*, midyear meeting, Edgewater Hotel, Chicago, Ill., June 9-11.
NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION, Edgewater Beach Hotel, Chicago, Ill., week of March 2.
NATIONAL PLASTICS EXPOSITION, second, Coliseum, Chicago, Ill., May 5-11.
PACIFIC CHEMICAL EXPOSITION, San Francisco Civic Auditorium, San Francisco, Calif., October 21-25.

Data On Fat Substitutes

Detailed information on Derminols, a group of German synthetic fat substitutes for use in treating leather, is contained in a report (PB-40346) prepared by the Office of Technical Services, Department of Commerce. Experimentally produced by I. G. Farben, some of the materials are said to be desirable for greasing, impregating and preserving leather.

The basic "Derminol" is produced by the condensation of ethylene chloride and xylol or by sulfurization of xylol. A material with improved water resistance is made by adding polyvinyl ether, and an easily absorbed tallow-substitute for greasing leather is obtained by the addition of chlorinated paraffin.

"Densodrin," a dark highly viscous oil, suitable for impregnating and preserving leather is produced by varying the proportions of xylol and ethtylene-chloride. Other viscosity quantities are produced by altering the proportions of xylol-sulfur-chloride.

Work is still in progress on the use of other catalysts, such as zinc dust, zinc chloride and silicon tetrachloride.

Mathieson Advances Drummond and Bennett

D. W. Drummond (left) and Arthur T. Bennett, recently elected vice-presidents of Mathieson Alkali Works. Mr. Drummond's new title is vice-president-general manager of sales and Mr. Bennett has assumed the post of vice-president-general manager of operations.

Sulfa Drugs Offered by WAA

Approximately $750,000 worth of surplus sulfa drugs including sulfathiozole, sulfadiazine, sulfanilamide, sulfaguanindine and sulfapyridine, each in both powder and tablet form, are being offered for sale at fixed prices by War Assets Administration.

Large quantities of sulfa drugs have been sold by WAA in the past and have been offered previously to priority groups. However, 10 percent of the present offering is being reserved to fulfill further needs of priority claimants.

Largest quantities of the drugs are located in the New York, Boston, Cincinnati, Denver, Louisville, San Francisco and St. Louis regions. Smaller quantities are in stock in several other regions and shipments will be made to buyers from the nearest regions with inventories.

Plans More Engineering Courses

An appeal is being made to the Texas legislature, by the board of trustees of Lamar College at Beaumont, to expand the college into a four-year, state-supported institution with a curriculum emphasing chemical engineering, particularly industrial chemistry, as connected with the industries of Southeast Texas.

Develop Compact Atom Smasher

A beam of 70,000,000-volt X-rays has been produced in the General Electric Research Laboratory from a new and compact type of atom-smasher, the synchrotron.

This was reported at Philadelphia by Herbert C. Pollock, General Electric Research Laboratory scientist and leader of the group working on it, in a lecture before the Franklin Institute describing various types of atom-smashers.

The success of this device, the first to operate in the Americas, and built as part of a project sponsored by the Office of Naval Research, indicates the possibility of producing radiations of much higher energies, for atomic study, with greater economy than with earlier equipment, according to Dr. Pollock.

The synchrotron as originally proposed was invented independently by V. I. Veksler, in Russia, and E. M. McMillan of the University of California where a 300,000,000-volt synchrotron is under construction. The new atom-smasher in its present form combines certain features of the cyclotron with those of the betatron, another type recently developed. While the cyclotron is used for accelerating protons, positively charged atomic particles, the synchrotron and betatron both are used for accelerating electrons, which have negative charges.

Though the 70,000,000-volt radiation from the new synchrotron has more than two-thirds the energy of that from the betatron, the machine is smaller, weighing only about 8 tons.

Thus it offers possibilities for going to much higher voltages with less weight of iron. The 200,000,000-volt cyclotron recently placed in operation at the University of California weighs about 4000 tons.

Fungicide Testing Data Available

Tests for determining the strength of fungicide compounds in mildew-proofed materials are described in a U. S. Army manual now on sale by the Office of Technical Services, Department of Commerce.

Most of fungicide treatments described in the report are used for cotton textiles, but some are applicable to wood, paint, leather, and wool.

Tests for the following fungicides are

described: copper (including copper naphthenate and copper ocyquinolate); pentachlorophenol; dihydroxy-dichlorodiphenylmethane (DDDM); arganomercurials; tetrabromorthocresol; zinc diethyldithio carbamate; salicyl anilide; amino guaiacol benzothiazole imino urea; hyamine 3258; silver.

Orders for the report (*Methods of Analysis for Fungicides;* PB-39772; photostat, $4; microfilm, $2; 54 pages, including drawings) should be addressed to the Office of Technical Services, Department of Commerce.

Chemicals Wanted

The following chemicals are wanted by the National Registry of Rare Chemicals, Armour Research Foundation, 33 Federal and Dearborn Sts., Chicago 16.

p-Thiocyanophenylhydrazine hydrochloride
Talomucic acid
Eicosenol-1
Docosenol-1
Behenic acid
Trilaurylamine
p-Benzylphenol
2-Pyridine aldehyde
N-Piperidineacetaldehyde
2,4-Dimethyl thiazole
o,p-Dihydroxydiphenyl
3-Pyridine aldehyde
1,18-Octadecandioic acid
o-Isopropylphenol
Methyloctanes
Dimethylheptanes
Dimethylethylpentanes
Tetramethylpentanes
Methylethylhexanes
Dimethylcyclohexanes
Trimethylcyclopentanes
Dimethylethylbenzenes
Methylpropylbenzenes
Nucleoprotein

Kellogg Assumes Presidency

Howard Kellogg, Jr., formerly executive vice-president of Spencer Kellogg & Sons Inc., Buffalo, has assumed the presidency of the concern. Howard Kellogg, Sr. is now board chairman.

Infra-Red Analysis Data Compiled

A highly sensitive infra-red gas analyzer designed at Johns Hopkins University during the war can detect one part of carbon monoxide or carbon dioxide in 50,000 parts of air, according to a report released by the Office of Technical Service, Department of Commerce.

The instrument can make a continuous, automatic analysis of any gas or mixture of gases capable of absorbing infra-red rays. It can also detect the presence of a specific gas in a mixture and measure its concentration. When properly adjusted, it can give a reading within three seconds after receiving a sample of gas.

The report contains a broad review of various infra-red methods for detecting gases as well as a detailed description of the design and construction of the infra-red gas analyzer.

Orders for the report (*Selective Infra-red Gas Analyzers;* PB-40546; photostat, $4; microfilm, $2; 50 pages, including drawings, graphs, and photographs) should be addressed to the Office of Technical Services, Department of Commerce, Washington 25, D. C.

Sulfite Alcohol Plant Sold To Operator

War Assets Administration has approved sale of a Bellingham, Wash., alcohol plant to its wartime operator, the Puget Sound Pulp & Timber Co., for $450,000.

Designed for the production of alcohol from sulfite waste liquor, the plant is the only one of its type in the United States. It has a rated capacity of 6,140 gallons of ethyl alcohol per day.

COMPANIES

Dow-Velasco Deal Finalized

Sale of the war-surplus Dow-Velasco plants, Velasco, Texas, to the Dow Chemical Co., Midland, Mich., for $35,155,000 has been approved by War Assets Administration.

The sale includes all the facilities of the magnesium plant except the magnesium metal-producing units; the styrene and Thiokol "N" synthetic rubber plants which cost the government $17,096,825 and $1,386,737, respectively; and a 725-acre land tract northwest of Velasco in Brazoria County which cost the government $141,326.

The portion of the magnesium plant to be sold had an original cost to the government of $30,373,384 and includes power, chloride and caustic, and lime plants, shop and service buildings, laboratory and warehouses. This portion represents about half, in original cost, of the magnesium facilities.

Approximately 75 buildings with a floor area of 196,946 square feet of space on a land tract of 208 acres constitute the styrene plant which was sponsored by the RFC Office of Rubber Reserve. The plant comprises four complete trains with each one capable of being operated independently with a designed capacity of 12,500 short tons of styrene per year.

Each of the four trains comprises an ethyl-benzine unit, ethyl-benzine cracking unit and styrene finishing unit.

About 40 acres on which are 13 buildings supplying 97,600 square feet of space and foundations for three other structures never completed comprise the Thiokol "N" synthetic rubber plant which also was built under sponsorship of the RFC Office of Rubber Reserve.

Boost Synthetic Detergent Output

Construction of a $3,000,000 plant in Monsanto, Ill., to expand production of synthetic detergents is planned by Monsanto Chemical Company.

The unit, a one-story, concrete building already under construction, should be in operation this year.

The Monsanto plant at Nitro, W. Va., is also being enlarged to further increase the production of detergents.

Armour Sponsors Flotation Research

Establishment by Armour and Company of a fund of $12,000 for a graduate research program in the fundamentals of mineral flotation at the Massachusetts Institute of Technology, has been announced.

This program, which provides for grants-in-aid for several assistantships and fellowships, will concentrate on the operation of cationic collectors, particularly the organic compounds such as amines and amine salts. These cationic collectors when dissolved in water give rise to hydrocarbon-chained ions that are positively charged. On the contrary, most flotation reagents, such as the xanthates, soaps and fatty acids give negatively charged hydrocarbon-chained ions.

Wyandotte Promotes Clark

Melvin E. Clark, advanced to the post of sales manager, Michigan Alkali Division, Wyandotte Chemicals Corp. He was formerly director of market research.

Pfaudler Establishes Fellowship

The Pfaudler Company, Rochester, N. Y., has provided a Fellowship in chemical engineering at the University of Rochester. The recipient of the fellowship who will receive a $1,200 award, in addition to a scholarship, will be a student working in the Graduate School for the master's degree.

Research in agitation and mixing will be the subject of the thesis for the degree.

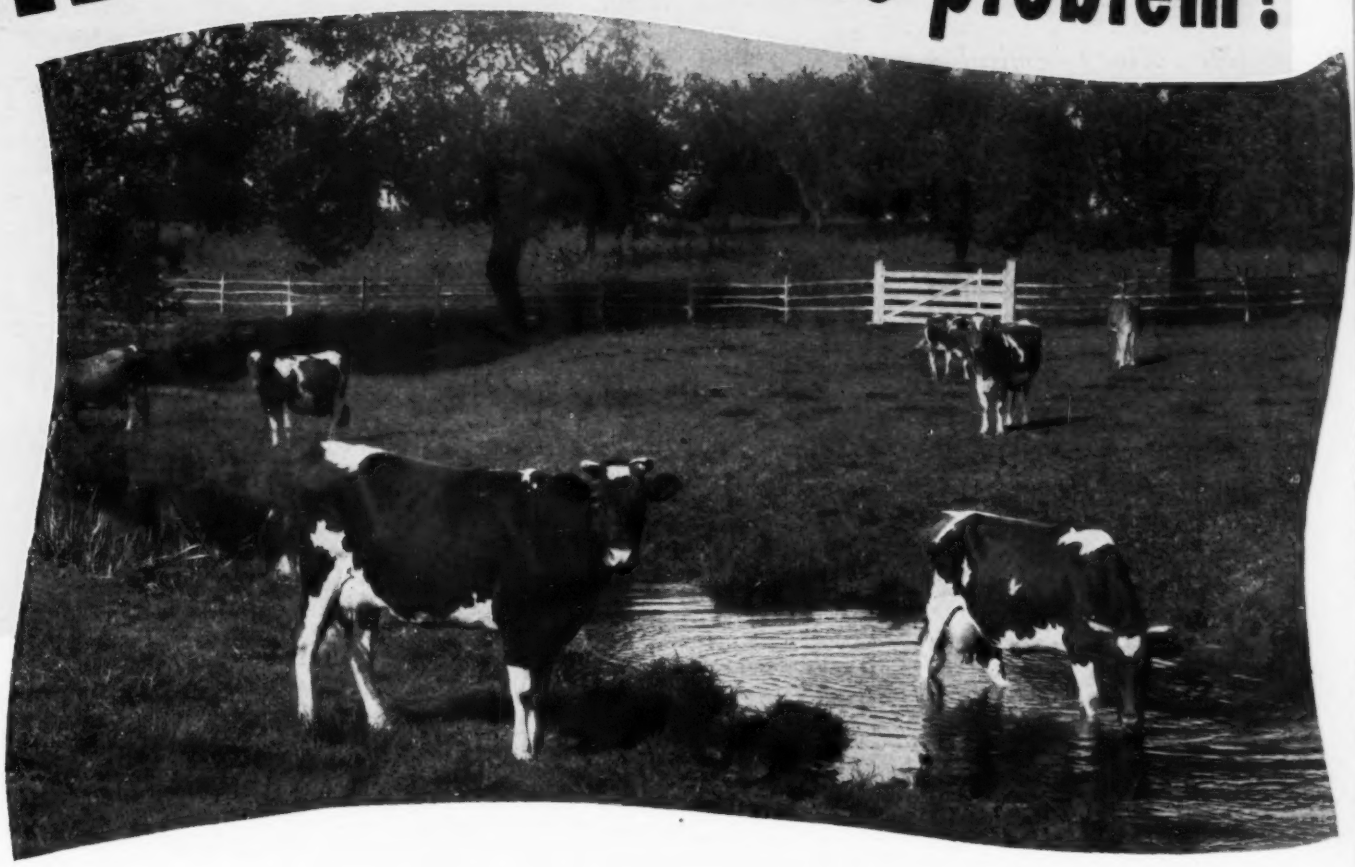
Merger Expands Edwal Facilities

As part of an expansion program to provide added production facilities for its fine organic chemicals and pharmaceutical intermediates, the stockholders of the Edwal Laboratories of Chicago and the Ringwood Chemical Corporation of Ringwood, Illinois, recently approved a merger of the two companies.

Edwal acquires all assets of Ringwood Chemical Corporation including four brick buildings fully equipped for manufacturing and warehousing. The 27 acres of land on which the Ringwood Plant is located will provide adequate space for future expansion.

The company contemplates shifting to Ringwood practically all of the manufacturing and research operations now done in Chicago, but it will retain its execu-

WEEDS—the No. 1 pasture problem!



Baker's 2,4-D

KILLS NOXIOUS PASTURE WEEDS—CUTS WASTE OF FERTILIZER AND LABOR—GIVES MORE GRAZING PER ACRE!

Weeds in pastures take a heavy toll from livestock raisers every year. The total no doubt runs into tens of millions of dollars! Weeds are the livestock man's No. 1 pasture problem!

Weeds crowd out grasses—rob them of essential plant food and moisture. They waste money and time spent on fertilizer and labor. They reduce the grazing capacity of pasture, so that considerably fewer livestock can be carried per acre.

Some weeds, also, act as hosts for insects . . . some poison or injure livestock . . . several taint the flavor of dairy products . . . a good many directly depreciate the value of land.

Killing pasture weeds makes more grass available for livestock — reduces weed-associated losses — increases pasture profits!

Many noxious weeds can be killed with 2,4-D — including such important pasture weeds as ragweed, peppergrass, sunflower, bindweed, Canadian thistle, plantain, burdock, horse nettle, cocklebur, wild carrot, wild onion, dock and leafy spurge, to name but a few.

To those who formulate weed killers, here is a tremendous market!

The J. T. Baker Chemical Company supplies your needs two ways:

Raw materials for manufacturing weed killers such as acid 2,4-D, and the sodium salt of 2,4-D, which is water soluble.

Baker's 2,4-D formulated concentrates, which are ready for dilution by the consumer and ready for your distribution, trademark and label.

Whether you are interested in either or both, write for further facts and prices. Address Organic Chemical Division, J. T. Baker Chemical Co., *Executive Office,* Phillipsburg, N.J.

Baker's Chemicals

C. P. ANALYZED • FINE • INDUSTRIAL

tive offices at the present location on Federal Street as well as service laboratory facilities.

New Zinc Chemical Company Organized

Zinc Chemical Co., Inc., has been formed jointly by The Glidden Co., International Minerals & Metals Corp. and the Phelps Dodge Refining Corp.

The new company, with Walter C. Bennett as president, will have executive and sales offices in New York City. The plant will be located at Baltimore, Md.

Various grades of zinc sulphate will be made. Production will be under the direction of The Glidden Co. Phelps Dodge Refining will handle sales.

Directors of Zinc Chemicals are: Walter C. Bennett, Otto Frohnknecht, J. Mills Hawkins, Dwight P. Joyce and William J. O'Brien. Officers, excluding Mr. Bennett, are: William J. O'Brien, vice president; F. R. Jeffrey, secretary; J. Mills Hawkins, comptroller, and M. W. Urguhart, treasurer.

Monsanto Forms Western Division

Formation in Seattle of a Western Division as a unit to supervise operations centered on the Pacific Coast has been completed by Monsanto Chemical Company.

The new operating division consists of four plants devoted to the manufacture of plywood glues, paint and wood preservatives. One plant is situated at Los Angeles, Calif., and major plant sites are situated at Seattle, where a $2,000,000, three-year construction program is scheduled to start next spring. Included in the division are units at Lockport, N. Y., and Portsmouth, Va.

The four plants of the new division were the principal units of I. F. Laucks, Inc., which has been operated by Monsanto as a wholly-owned subsidiary since its 1944 merger with the St. Louis company.

Harry P. Banks, president of the Laucks organization, has been elected vice-president of Monsanto and general manager of the Western Division.

Swenson Promoted by USDA

Theodore L. Swenson, named special assistant to Louis B. Howard, chief of the Bureau of Agricultural and Industrial Chemistry, USDA. Dr. Swenson was director of the Western Regional Research Laboratory, Albany, N. Y.

Koppers Buys Alkylate Facilities

War Assets Administration reports that a refinery unit and auxiliaries in Oil City, Pa., has been sold to the Koppers Co., Inc., for $1,230,125.

During the war the Oil City refinery was operated by the Pennzoil Co. to produce alkylate, a component of aviation gasoline. Koppers Co., WAA said, intends to expend $1,500,000 over a period of several years to convert the facility to full operation in production of alkylate aromatic compounds.

Celanese Sells Debentures

Impetus to the program of long range plant expansion undertaken by Celanese Corporation of America has been given by the addition of $25,000,000 to its cash reserves through the private sale of debentures, according to Harold Blancke, president of the corporation.

This program of plant expansion covers the three major fields of the corporation's operations, synthetic textiles, chemicals and plastics, and includes construction of

additional producing facilities at several locations. The increased capital provided by the sale of debentures will be added to the general funds of the corporation to accelerate the plant expansion program.

Monsanto Promotes Semple

Robert B. Semple, named to the post of director of the general development department of Monsanto Chemical Co., St. Louis. He is succeeded as petroleum chemicals sales manager by John W. Newcombe.

National Oil Earnings Gain

Sales of National Oil Products Co., Harrison, N. J., in 1946 are expected to exceed the $15.2 million volume for 1945, according to Charles P. Gulick, president. Barring unforeseen year-end adjustments, net income for 1946, after all charges (including a non-recurring debenture amortization expense of approximately $75,000) will be substantially more than the $494,635 earned after all charges and taxes in 1945.

The directors have also voted to change the company's name to Nopco Chemical Co., subject to the approval of stockholders at their annual March meeting.

Consolidated to Double Facilities

Consolidated Industries, Inc., producer of heavy chemicals, is planning to double the capacity of its Fort Worth plant, which produces muriatic and sulphuric acid.

The firm has a $4,000,000 plant in Houston which makes muriatic, sulphuric, and nitric acids, bone black, potassium sulphate and potassium chloride.

New Subsidiary to Handle Standard Chemicals

Standard Oil Co. (N. J.) has recently formed Enjay Co., Inc., as a subsidiary to handle national and export distrtibution of petroleum-based chemicals. Enjay has taken over the sale of synthetic alcohols, synthetic rubbers, additives, and other products previously handled by the

chemical products department of Stanco Distrubutors, Inc., and Standard Alcohol Co.

H. W. Fisher is president of the new company. Enjay officials in addition to Mr. Fisher, are John A. Britton, Jr., and James G. Park, vice presidents; W. F. Quick, secretary; H. P. Schoeck, treasurer; G. M. Buckingham, assistant secretary, and L. R. Moor, assistant treasurer.

Watson Named Chief Chemist

Glenn S. Watson, appointed chief chemist, Marietta Works, Calco Chemical Division of American Cyanamid Co. He has been with Calco since 1936.

New Research Organization

Horizons Incorporated, a new research company, has recently been formed with headquarters at Princeton, New Jersey. It will engage in research and development in the fields of chemistry, metallurgy, and ceramics. The research staff will be directed by Eugene Wainer, former associate director of research of the Titanium Alloy Manufacturing Co.

All employees of this organization will share in the profits of the company.

The officers are: president, Edwin T. Goodridge; vice president in charge of research, Eugene Wainer; treasurer, Edwin T. Goodridge.

Silica Gel Unit Sold

War Assets Administration has sold a silica gel plant in Baltimore, Md., to the Franklin Realty and Finance Co., Inc., Baltimore, for $175,635.

The plant was operated during the war by the Davison Chemical Corporation to produce silica gel. The purchaser says that it would be used to produce prefabricated houses for veterans, and also to produce copper sulphate and fertilizer.

Swift Acquires Vegetable Oil Company

Swift & Co., Chicago, has taken over all the oil mill properties formerly owned

and operated by Consumers Cotton Oil Co.

Consumers Cotton Oil Co., a Texas corporation which has been dissolved, has been the owner and operator of crushing mills and peanut shelling plants in 15 Texas communities and one Oklahoma community. The Consumers Co. has been crushing and extracting oil from cottonseed, peanuts, soybeans, and other oil-bearing seeds.

Winthrop Extends Packaging Facilities

General packaging facilities are being enlarged at the plant of the Winthrop Chemical Company, Inc., Rensselaer, N. Y., according to A. E. Sherndal, vice-president and plant manager.

Part of the space vacated by the ampul division is currently being revamped for this purpose. This will provide about 5,000 square feet additional space for packaging procedures. At present the department is handling approximately 1,000 different packings.

Monsanto Schedules Research Unit Expansion

Early construction of a new pilot plant to further plastics research is planned by Monsanto Chemical Company's Plastics Division at Springfield. The new building, to cost an estimated $175,000, will be completed by early summer.

The new unit will more than double the facilities for production, research and development work of the company's research department.

Company officials also state that the color laboratory will be tripled in size and new injection molding equipment will be installed to facilitate sample molding runs.

Company Notes

General offices of CARBOZITE PROTECTIVE COATINGS, INC., formerly known as Carbozite Companies, have moved from Pittsburgh, Pa., to the company's plant at 811 South Main Street, Greensburg, Pa. Officers of the company will continue to serve in their present capacities.

The Chicago branch of HEYDEN CHEMICAL CORP. has been moved to 20 North Wacker Drive.

F. A. Degener remains in charge of the Chicago office.

Net earnings of DRESSER INDUSTRIES, INC. for its fiscal year ended October 31, 1946, totaled $1,037,235 on net sales of $54,783,188, according to the company's annual report to shareholders. This compares with net earnings of $1,921,628 on net sales of $80,544,911 in the previous year.

COMMERCIAL SOLVENTS CORP. has purchased the physical assets, trademarks, and goodwill of the Pennsylvania Alcohol and Chemical Corp. and will continue to operate the company under the same corporate title, but as a Division of Commercial Solvents.

Kemmerer Joins Bristol

Robert A. Kemmerer has joined Bristol Laboratories Inc. as head of its engineering and maintenance division. He studied at Rensselaer Polytechnical Institute.

NAUGATUCK CHEMICAL division of United States Rubber Company is opening a branch in Los Angeles. The branch office will be the West Coast headquarters for the sale of all of the company's

chemicals, and will also have equipment for preparation of Lotols and the drumming of natural and synthetic latex. For these facilities and offices, 15,000 square feet of floor space have been acquired at 19201 South Vermont Avenue. Los Angeles.

FOSTER D. SNELL, INC., consulting chemists and engineers, is in the course of moving its headquarters to 29 W. 15th St., New York. Some of the departments have already transferred from the former location at 305 Washington St., Brooklyn, with others to follow in the near future.

Hartz Joins Orbis

George Hartz, formerly chief chemist of John Powell & Co., has joined Orbis Products Corp., New York. He will act as a technical sales consultant.

A fellowship in Chemical Engineering at the University of Michigan, Ann Arbor, Mich., has been established by CELANESE CORPORATION OF AMERICA. The fellowship is for a term of five years from the time of the appointment of the first recipient, and the subjects to be investigated under it will relate to the field of plastics and high polymers.

To provide for future expansion plans, HERCULES POWDER CO. has recently arranged to purchase 284 acres of land which adjoins the present site of its Experiment Station, near Wilmington. No definite plans for the use of the tract have been formulated, but the creation of additional laboratory facilities and a real estate development for company employees is under consideration.

STEIN HALL & COMPANY, INC., has opened a New York sales branch office in the Empire State Building, New York City. The company's home office is at 285 Madison Ave.

THE REASOR-HILL CORP. has been organized by Gerald L. Reasor and Lyle O. Hill to manufacture agricultural chem-

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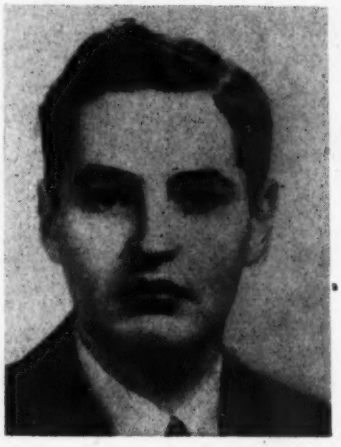
icals and insecticides. Besides this corporation Mr. Reasor owns and operates the Reasor Manufacturing Company, St. Charles, Illinois, and the Southern Naval Stores Division of Leach Bros., Inc., Columbia, Mississippi.

Lappin Moves to New Research Post



Gerald R. Lappin has joined Vernay Laboratories Inc., Yellow Springs, Ohio, as a research chemist. Dr. Lappin has held several fellowships at Northwestern University.

At a recent meeting of the board of directors, W. M. STIEH was elected president of the Darsyn Laboratories, an affiliate of the Metalsalts Corporation. GORDON GOULD, president of the New Idria Mining Company of San Francisco, together with Mr. Stieh were elected members of the board of directors.

CHAS. PFIZER & CO., INC., Brooklyn, has recently obtained title to the Victory Yard Property, Groton, Conn., from War Assets Administration. Although the company's bid for the plant was accepted last April, transfer of title has been delayed because of the necessity of the government's removing some equipment, and as a result of the numerous legal details incident to the transaction.

Pfizer plans to convert the plant for chemical production, and has already completed a substantial part of the design work, and has let some construction contracts.

MICHIGAN BLEACH AND CHEMICAL CO., Detroit, Mich., has recently changed its corporate name to NELSON CHEMICALS CORP. The change also affects the company's Cleveland and Windsor, Canada, affiliates.

The CALCO CHEMICAL DIVISION, AMERICAN CYANAMID COMPANY, Bound Brook, N. J., announces that a new sales unit, the Rubber Chemicals Department, has been created to handle the sale of rubber chemicals. The Rubber Chemicals Department of the American Cyanamid Company has been merged with the new

Calco sales unit, under Bancroft W. Henderson.

Winters Assumes Sales Post

Walt M. Winters, advanced to the post of manager of sales, Automatic Temperature Control Co. He has authored a number of articles on metallurgical and chemical process industry problems.

ARIDYE CORP., heretofore a wholly owned subsidiary of INTERCHEMICAL CORP., is now a division of the parent company and will carry the corporate name of Textile Colors Division.

ASSOCIATED CHEMICALS, Omaha, Neb., has been appointed representatives for Edward Remus & Co., Inc., New York importers and exporters of essential oils and aromatic products.

SHELL CHEMICAL CO. has appropriated $1 million for the expansion of its Pittsburg, Cal., ammonia and ammonium sulfate facilities.

PERSONNEL

Emulsol Advances Joffe And Shaffer

At a recent meeting of the board of directors of The Emulsol Corp., Chicago, M. H. Joffe was elected vice-president in charge of sales and B. M. Shaffer was named to the post of vice-president in charge of new products development.

Mr. Joffe, a graduate of the University of Illinois, has been associated with the company since 1930. Mr. Shaffer, who was graduated from the University of Toronto, joined Emulsol in 1926.

Standard Oil Promotes Research Men

To help meet the requirements of an expanding research and development program, Standard Oil Development Company, central technical and research or-

ganization of Standard Oil Company (New Jersey), has elected three new vice-presidents and directors.

The new officers, who increase the number of directors to 14, are Willard C. Asbury, who will be in charge of contract and patent activities, and E. Duer Reeves and William J. Sweeney, who will direct the company's work in research and development. Simultaneously, William R. Carlisle, a vice-president and director of the Development Company, was appointed associate general counsel of Jersey Standard.

Lidbury Retires From Oldbury

Oldbury Electro Chemical Co. announces the resignation of F. A. Lidbury as president and treasurer and the appointment of Walter Wallace as Mr. Lidbury's successor.

In addition, Earl F. Whitford has been advanced to the post of vice-president and assistant treasurer, Marion B. Geiger has been named secretary, and A. T. Hinckley assistant secretary. N. Harold Fyffe has been promoted to the position of general sales manager.

DuPont Staff Changes

The Du Pont Company has announced the appointment of Robert L. Richards as assistant general manager of the Rayon Department and a series of other personal changes in that department.

Willis Shackelford, manager of the Acetate Division, succeeds Mr. Richards as an assistant manager of the department. G. W. Filson, assistant manager of the Rayon Division, succeeds Mr. Shackelford, and George E. McClellan, director of production of the Rayon Division, succeeds Dr. Filson.

USSR Exiles Scientist

According to recent reports, Peter L. Kapitza, world-renowned physicist and Russia's foremost atomic scientist, has been arrested and exiled to Siberia. The scientist was named to head research into the atomic bomb, but has been charged with shirking his duty, and "purged."

Last April the National Academy of Sciences in Washington conferred its coveted membership on the Russian scientist, who was then director of the Institute for Physical Problems of the Academy of Sciences of the USSR.

Standard Advances Mikeska

In continuing steps toward establishing a system to give greater recognition to noteworthy technical achievements by its staff, Standard Oil Development has appointed L. A. Mikeska a Senior Research Associate.

The title awarded Dr. Mikeska, who is widely known in scientific circles for his work on the structure of hydrocarbons, is one that will be given from time to time to those who merit it, said E. V. Murphree, executive vice-president in charge of research.

Personnel Notes

Retirement of ROBERT L. CLAUSE as vice chairman of the board of directors of the Pittsburgh Plate Glass Company, effective February 1, was announced recently by HARRY B. HIGGINS, president of the firm. Mr. Clause has served in that capacity since 1944. Prior to his election to the vice chairmanship, he served as president of the firm for a three year period.

WAYNE C. EDMISTER has been placed in charge of chemical engineering on the civilian atomic development project at Camp Upton, N. Y. This project is being operated by Delner Corp., a subsidiary of Hydrocarbon Research, Inc. Mr. Edmister was formerly with Foster-Wheeler Corp.

JOHN M. LONG, formerly manager of the sales research division of Hercules Powder Company, has been appointed special assistant to the general manager of the Paper Makers Chemical Department.

CARL W. EURENIUS, control supervisor of the Cellulose Products Department, has been appointed manager of the company's sales research division to succeed Dr. Long.

DON ROGERS, vice president and general manager of the Mac-o-lac Paint & Varnish Works, Detroit, severed his connection as an officer of the company on December 31, 1946, to devote more time to the Rogers Chemical Corporation of which he is president.

A. M. FREEMAN has been appointed director of technical service, of the Casein Company of America, Division of the Borden Company.

FRED FOX, JR. has been named assistant secretary and assistant treasurer of the Pennsylvania Coal Products Company.

C. F. WINANS has been appointed chemical director of the company.

WILLIAM J. AUSTIN, Hercules Powder Company's director of purchases since 1942, retired Dec. 31. ANDREW VANBEEK, an assistant director of purchases, succeeded him as director of the department.

A. H. TENNEY has returned to the New York offices of Carbide and Carbon Chemicals Corporation as a technical representative for the Fine Chemicals Division. He will specialize in the development of markets for new chemicals.

CHEMICAL SPECIALTIES

A department devoted to news of the chemical specialties field. Descriptions of new specialty products will be found in the New Products & Processes department.

Shell Tests Pre-Harvest Spray

A new pre-harvest spray called Endrop, which prevent apples from dropping prematurely, has proved highly effective in its first commercial scale tests in Eastern orchards, according to the manufacturers, Shell Oil Company, Inc., New York. The tests were conducted on 500 acres of the 3,000-acre apple orchards owned by Senator Harry F. Byrd in Berryville, Va.

The spray, in which oil serves as a carrier for alpha naphthalene acetic acid, delays fruit-drop until 10 days and sometimes as much as three weeks after it would normally occur.

In the tests mentioned, Endrop was applied by airplane at the rate of 15 to 20 acres an hour from a height 25 to 40 feet above the trees.

Aquella Concrete Treating Compound

Few compounds have attracted more attention in recent years than Aquella—a product manufactured by Prima Products, Inc., N. Y., and designed to be used for "waterproofing" concrete. It is sold in two grades, packaged as a fine white powder which is prepared as a water slurry for application to concrete, masonry blocks, and kindred surfaces. By reacting with the lime in wall surface materials a stable bond is said to be formed, which reduces the porosity of the surface.

An analysis made by Robert W. Hunt Co., and reported in the Bulletin of the Board of Standards and Appeals of the City of New York, lists the compound's composition as follows:

Loss on ignition	9.71
Silica	42.96
Iron oxide	0.20
Alumina	7.34
Calcium oxide	38.09
Magnesia	0.83
Sulfuric anhydride	0.82

Both Aquella 1 and Aquella 2, for interior and exterior work respectively, are quite similar.

Hood Buys Beacon Products

Hood Chemical Co., Philadelphia, has purchased Beacon Products Co. and its two subsidiaries, which operate production plants and warehouses in Philadelphia, Chicago, Pittsburgh, Dallas and Jacksonville.

The Beacon Products Co., is parent company to the Mars Chemical Co. of Chicago and the Blanco Products Co. of Dallas. Beacon makes bleaches and other household products.

The Hood firm explained it is diversifying its production. It disclosed it is seeking a plant location in southwestern Pennsylvania or eastern Ohio to increase its output.

Todd to Exploit Foreign Markets

Todd Shipyards Corporation has joined with the British manufacturing firm of R. A. Lister, Ltd., of Dursley, England, to form a new company, Lister-Todd, Ltd., of London, for the manufacture and sale throughout the British Empire, and in Europe and Asia, of the Todd insecticidal fog applicator.

The new jointly-owned company will have its headquarters at 15 Kingsway, W. C. 2, London, and the machine will be manufactured at the Lister works in Dursley. J. H. Williams has been appointed managing director of Lister-Todd.

Albi Promotes Novel Fire Retardant

Set up last year specifically to handle fire retardant coatings, Albi Chemical Co., Inc. (a subsidiary of Albi Chemical Corp., New York), is planning to substantially increase its output this year, and is completing national marketing plans.

Developed over a period of three years, Albi-R is a fire retardant coating material applied like paint to interior combustible surfaces. While it serves the function of decoration and maintenance, its primary purpose is protection against fire. It can be applied directly to painted or wallpapered surfaces, as well as to wood, plywood, and fibre board. When flame is applied to such a treated surface the coating puffs out to form a blister-like heavy insulation mat of incombustible material.

According to the company, it is the only fire retardant material listed by the Underwriters Laboratories, Inc., and carries the approval of the New York Board of Standards and Appeals.

Novel Fruit Thinning Chemical

Thinning of many types of fruit trees by hand labor, long a source of added expense to the fruit growing industry, can be eliminated, A. L. Kenworthy, research professor, University of Delaware Agricultural Experimental Station, reported recently before the American Society of Horticulture Science. Dr. Kenworthy said that in a series of control tests conducted by the Delaware Station the number of fruit per apple tree had been reduced up to 50 per cent through the use of a new spray mixture applied two weeks after full bloom.

The spray, a product of B. F. Goodrich Chemical Company, is a mixture of Goodrich p.e.p.s. (polyethylene polysulphide and zinc dimethly dithiocarbamate

A test panel of wood, previously treated with a coating of Albi-R paint, is shown after being subjected to a fire test at the Underwriters Laboratories, Inc. The paint puffs up to form a heavy insulating blanket. This charred material can be easily cleaned off so that the unharmed wood can be refinished.

and cyclohexylamine). It is non-injurious and non-caustic to both fruit and tree and in eliminating the necessity of hand labor to remove excessive and undesirable fruit before harvest, also produced a larger variety and a healthier crop. Results indicate that to attain a 50 per cent fruit reduction, the spray concentration should be two pounds of p.e.p.s. and ¼ pound zinc dimethyl dithiocarbamate and cyclohexylamine per 100 gallons of water. Indications also show that the spray mixture will be a suitable thinner for peaches.

Pennsalt Centralizes Packaging Activities

Expanding its activities in the field of chemical specialties and chemical products for consumers, the Pennsylvania Salt Manufacturing Company has established a new packaging and labeling division, which began operations in December.

George W. Benbury has been appointed manager of the new division, and Joseph A. Noone has been named technical adviser on labels and registration.

Babbitt Completes Midwest Unit

B. T. Babbitt, Inc., producer and distributor of household cleansers and lye, has completed a new half-million dollar plant at 6233 West 65th Street in Clearing, Illinois. Production on Bab-O, the company's principal product, has already begun.

According to Alton P. Mendleson, vice-president in charge of production, under whose supervision the construction was carried out, the new plant was built in the Chicago area to take care of increased consumer demands in the Middle West. Robert Anderson has been appointed plant manager.

New Naphtha Project

Operation has begun on the new $1.5 million naphtha distilling plant at the Pure Oil Company's refinery at Nederland on the Texas gulf coast. Special naphtha solvents used in paint and other industries are being manufactured.

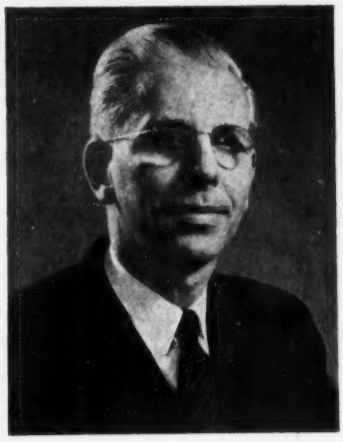
The distillation unit occupies a six-acre tract. Jack S. Allen is plant superintendent.

Interchemical Re-aligns Pacific Coast Divisions

Interchemical Corporation, in order to consolidate its Pacific Coast operations, has transferred the business and personnel of Scriver & Quinn, Inc., a West Coast subsidiary, to two other divisions.

Industrial finishes formerly sold by Scriver & Quinn will be sold by Interchemical's Finishes Division; and Scriver & Quinn consumer products will be marketed by Interchemical Corporation-Scriver & Quinn Finishes.

Haring Joins Powell



Robert C. Haring, associated with the National Aniline Division of Allied Chemical & Dye Corp. for the past 13 years, has joined John Powell & Co., Inc., New York. He will conduct research in insecticides, rodenticides, and herbicides.

Du Pont Markets 666 Formulation

Production of a new insecticide containing hexachlorocyclohexane, has been initiated by the Du Pont Co.

This new agricultural chemical specialty is being made available as Du Pont "Lexone" insecticide for large-scale experimental work and for use on selected crops during the coming season. This will be contributory to establishing its exact place in the field.

The insecticide contains 50 per cent hexachlorocyclohexane in a wettable powder formulation suitable for application in a water spray and for further dilution for dust application.

Dexter Markets New Detergent

A new dyeing agent and detergent has been developed by the Textile Chemical Division of the Dexter Chemical Corporation.

The product, Clavanol, a non-ionic synthetic detergent of a high molecular weight condensation product of polyethylene glycol, is available in two types; Clavanol Concentrate and a solution. They are soluble in warm or cold water and are resistant to lime, mild acid, and alkali.

They are claimed to be efficient emulsifying agents and can be used in emulsification processes where non-ionic properties are desirable; thus they can be employed in conjunction with both cationic and anionic precessing agents.

One of the more recently reported uses of Clavanol is in the manufacture of DDT emulsions.

CANADIAN NEWS

Soda Ash Output To Be Upped

Brunner, Mond (Canada) Ltd., major Canadian producer of soda ash, calcium chloride, and related products, is planning the expenditure of "several million dollars" on a 15-month plant expansion and improvement program, according to Mr. R. W. Atkinson, vice-president.

The company was founded in 1917 by Solvay Process Company and the then Brunner, Mond & Co. of England (now I. C. I.) and in 1919 a 150 ton soda ash unit was built at Amherstburg, Ont., centered in Ontario's 3000 square mile salt beds. Since then the company has been purchased in toto by Solvay.

Output (approximately 230 tons daily in 1940) has been closely geared to domestic needs, but in 1943 soda ash imports totaled 70,559 tons, which was pared to 20,141 tons by 1944.

Pittsburgh Paint Extends Facilities

Construction of a new $1 million factory at Long Branch, Ontario, on the outskirts of Toronto, Canada, has been announced by E. D. Griffin, vice president in charge of the paint division of the Pittsburgh Plate Glass Company. It will produce a complete line of paint, varnish and enamel products.

This plant is an addition to the present production facilities of The Murphy Paint Company, Ltd, in which the Pittsburgh company holds a substantial interest. Other Murphy plants are located at Montreal and Windsor.

Mineral Production Slightly Higher

An increase in the over-all value of Canadian mineral production from $498.7 millions in 1945 to $508.9 millions in 1946 is reported by the Dominion Bureau of Statistics.

Although hampered by a shortage of skilled labor, by strikes, and by a lack of essential equipment, the mining industry continued at a high level of operation, output being higher than in any other peacetime year and only 10% below the 1942 record of $566.7 millions, the Bureau reports.

Output of fuels, structural materials and other nonmetallics were at record levels, but the gains in these groups were more than offset by declines in the more important base metals.

Value of $304.7 millions for metals was the lowest since 1936, even though export prices for base metals were higher. Tonnage of copper was down 22% at 185,543 tons; zinc dropped 9% in volume to 235,917 tons; and nickel, like copper, was down 22% at 95,406 tons. Lead output increased slightly to 177,222 tons.

Gold production was up 19% in quantity and 14% in value to 3,214,377 fine ounces while the 12,778,218 oz. of silver turned out represented a decline in quantity but an increase of 75% in value.

Petroleum production at 7,688,000 bbls. was 800,000 bbls. less than in 1945 but value was up over $1 million at $14,961,000.

CIL Withdraws from Titania Market

Back in 1937 Canadian Industries Ltd. (I. C. I.-du Pont) and National Lead Co. formed Canada's major titanium oxide company, under the corporate title of Canadian Titanium Pigments Ltd. Since then the company has developed a substantial business in the distribution of National Lead's titania in the Dominion, and plans were formulated last year for the construction of Canada's first titanium oxide facilities by the Canadian company.

But last month Canadian Industries sold its 51 per cent interest in the subsidiary company to National Lead, and decided to withdraw completely from any part in the financing of the proposed $5 million titanium oxide plant. One of the factors bearing upon the decision was reported to be rising construction costs—said to be $4 million above original estimates.

CIL officials have not disclosed what sale price it received for its share of Titanium Pigments, however it is expected to be reflected in the next CIL consolidated balance sheet.

Major Zinc Refinery For Eastern Canada

Plans are currently nearing completion for the construction of an $11 million zinc refinery in the province of Quebec, according to provincial premier Maurice Duplessis.

According to Mr. Duplessis, Howard I. Young, president of American Zinc, Lead and Smelting Co., and A. W. Knight, president of Golden Manitou Mines, Ltd., Toronto, have completed arrangements with the Quebec government.

The projected refinery, to be incorporated as the American Quebec Zinc Refinery Co., Ltd., will be constructed in Chicoutimi County in southern Quebec. It is expected that it will be operating by next January.

MARKET OUTLOOK

Potash Demand to Exceed Probable Supply

Synthetic Detergents Face Promising Future

Greater Output of Linseed Forecast

Slight Easing of Molasses In Prospect

●

Potash Output to Continue Below Needs

In spite of anticipated high domestic production of potash this year, U. S. needs will be far from completely met, in the opinion of the Department of Commerce.

Government estimates place last year's output at 903,000 tons (K_2O), and requirements, including exports, at 965,000 tons. Both agricultural requirements of 800,000 tons and industrial needs of 100,000 tons will not be fully met, largely because of export commitments of 41,000 tons to Canada and 24,000 tons to other countries. Caustic potash and potassium carbonate are likely to remain in short supply too, at least until fertilizer consumption is pared.

A number of factors bear upon the present circumstances and influence the outlook. The continuation of accelerated food programs to meet foreign and domestic needs is a major supporting influence on fertilizer consumption. At present potash producers are operating at capacity; equipment is wearing out and is difficult to replace.

Government restrictions on full exploitation of potash resources on federally-owned land in New Mexico—imposed by the Department of Interior in 1934—have hampered the exploration of some new resources, according to some industrialists. Indications are that a slight easing of these restrictions may materialize. At least the matter is under consideration.

Full operation of potash production facilities has not been resumed, as yet, in Germany, France, Spain, Palestine, or Poland—major pre-war exporting nations. When they do begin to produce again, other questions will be posed. It is probable that the U. S. will encounter heavy competition in export fields, not only from these countries, but also from Russia.

Then, it is anticipated, U. S. producers will abandon marginal operations, and strive for more economical rather than capacity operations. But the future is not as yet clear; European subsidy policies, tariff policies, and the possible reorganization of foreign cartels all bear upon the prospects.

Synthetic Detergents Face the Future

That present circumstances favor synthetic detergent manufacturers there is no doubt; but, just as apparent is the fact that the synthetics are destined to hold a substantial part of the detergents market, and enjoy an even greater share of the total business in the future.

Prior to the war the manufacture of synthetic detergents was a comparatively small business. By and large these products had found a permanent place only in the industrial field, for even though selling prices were ten times that of soap, their unique properties rendered their use economically sound. Synthetics were able to do many jobs better than soap; they were able to handle some cleaning chores which could not be satisfactorily accomplished by soaps. But it was comparatively recently that they managed to corral a sizable share of the retail trade in cleaners. The shortage of fats and oils, and thereby of soap, assisted in their introduction. But consumer acceptance is the keystone. And it was readily forthcoming.

The annual soap production of the U. S. averages 4 billion pounds. Synthetic detergent output last year stood at about 125 million pounds; output this year may well be double that figure. Some manufacturers foresee a billion pound per annum market for the synthetics; and few care to be less optimistic. The facts apparent today are in themselves impressive.

At present fats and oils are seriously short. And there is but little prospect that the world will recover from its extreme shortage of fats and oils for at least several years. Too, as long as the dearth of vegetable oils exists the odds favor their being channeled to foods rather than to soaps. Of importance is the statement of one major soap producer that it is anticipated that the price of soap will remain at a comparatively high level for quite some time.

Equally significant is the announced policy of one leading manufacturer of synthetic detergents to hold the price line. And this at a time when almost any asking price could be obtained. It provides a clear indication of long-range thinking.

World conditions at present favor the synthetics, particularly those based on petroleum. And sales to the retail markets have burgeoned. Already 3 million pounds of the synthetics are sold annually in the form of shampoos and such proprietary items. Too, sharp inroads have been made into the household field long dominated by soap.

The shape of things to come may well be discernible now.

Larger Plantings of Flaxseed Scheduled

In the light of high prices and unprecedented demand for flaxseed—and its products such as linseed oil—flaxseed plantings this year are expected to be larger than 1944-46 average. Both the U. S. and Canada are recommending substantial increases in acreage—which could well mean a total output of more than the 142 million bushels during 1947. U. S. crops yielded 22,962,000 bushels, according to preliminary estimates, which is about twice the 1935-39 average but well below 1945.

During 1946 world acreage devoted to the production of flaxseed amounted to some 19.5 million acres. Decreases in Argentina and in India (1.3 million and 500,000 acres, respectively) were offset by increases in both the U. S. and Canada to bring the total to the 1935-39 level.

But the immediate prospects are not overly favorable. Unless arrangements can be made for the importation of new crop Argentine flaxseed or oil, supplies to June will not be more than 320 million pounds.

This would mean an average of 40 million pounds per month, which would pare consumption to the lowest rate since 1935-36, and one-third less than the average rate during the war years.

Molasses Stringency to Ease

Present indications are that enough molasses will be available this year to manufacture approximately one-half the nation's industrial alcohol needs. The situation was extremely tight in the latter part of 1946 with consumers drawing heavily on the RFC stockpile.

By contracts made with the Cuban government, early last year, the U. S. will receive approximately 165 million gallons of blackstrap molasses and 20 million gallons of alchohol during 1947. The 20 million gallons is slated to go into the government stockpile.

The deficit in 1947 U. S. industrial requirements must be made up in alcohol production from other raw materials—such as corn or potatoes—or, of course, by means of synthetic ethanol.

Chilean Nitrate Output Rises

In the three months June-August 1946, output of Chilean nitrate increased 26 percent over that in the like period of 1945. Totals were 414,945 and 327,528 metric tons, respectively, according to consular figures just reported.

Nitrate production in Chile was greatly stimulated after the close of the war in Europe. The transportation situation eased considerably and in the latter part of 1945 the port of Tocopilla saw the greatest activity in the history of nitrate shipping.

Fertilizer Exports and Imports Increase

Some 107,000 short tons of fertilizers and fertilizer materials valued at $1,269,000 were exported in October 1946. This tonnage was about the same as that for October 1945, but the value of the October 1946 shipments was 25% below that of the previous October.

Shipments of nitrogenous and potash materials, as well as normal superphosphate, were small in October, compared with a year ago, while phosphate rock and concentrated superphosphate were shipped in greater quantity. Exports for the first 10 months of 1946, January-October, totaled 1,058,000 short tons, with a value of $19,182,000, compared with 787,000 tons, valued at $12,805,000, a year ago.

Imports of fertilizers and fertilizer materials during October 1946 amounted to 95,000 short tons with a value of $2,927,000. This is an increase of 2% in tonnage and 11% in value over imports in October 1945. Imports in each classification in October were somewhat similar to those in October 1945. Total imports for January-October 1946 were 1,185,000 short tons valued at $33,067,000, a decrease of 21% by weight and 14% by value compared with the same period in 1945.

The January-October imports of ammonium sulphate and calcium cyanamide were relatively the same in the three-year periods 1938-40 and 1944-46. Imports of sodium nitrate have shown wide fluctuations, with the tonnage at a low level in 1946 compared with the other 5 years.

PAINT, VARNISH, LACQUER, AND FILLER

Item	*October 1946*	*September 1946*
Total sales reported by 680 establishments	$70,127,048	$63,053,906
Classified sales reported by 580 establishments:		
Trade sales of paint, varnish and lacquer	35,112,612	31,759,079
Industrial sales, total	28,178,648	24,014,380
Paint and varnish	20,755,548	17,578,358
Lacquer	7,423,100	6,436,022
Unclassified sales reported by 100 establishments	6,835,788	7,280,447

SULFUR

Period	*Production*	*Mine shipments*	*Apparent sales*
August 1946	356,355	384,938	354,464
September 1946	335,300	261,642	304,861
October 1946	333,041	257,137	230,465
August 1945	346,349	350,961	333,395
September 1945	341,060	256,317	269,860
October 1945	348,365	220,131	272,148

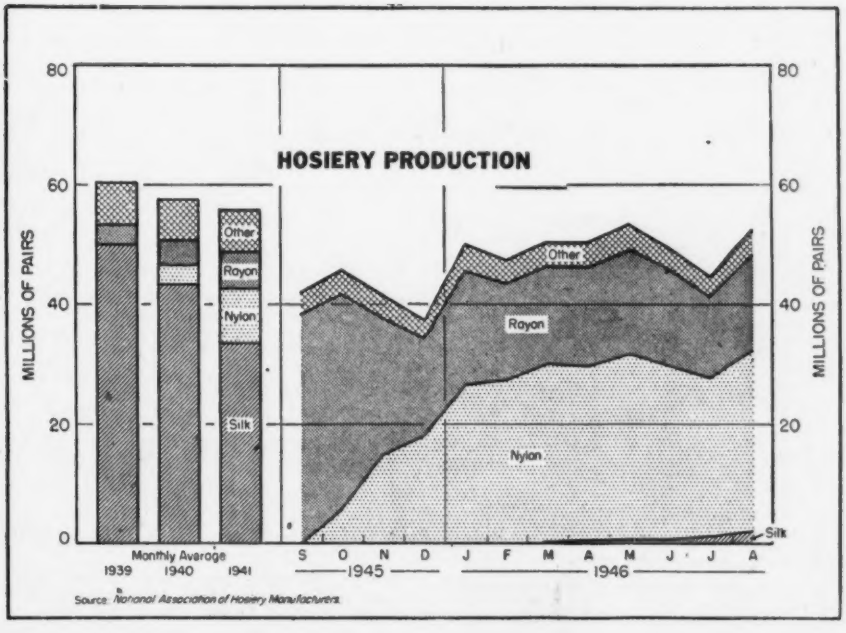
Barite Output Hits New Peak

Barite production in the third quarter of 1946 set a new record, according to the Bureau of Mines, United States Department of the Interior. The output, 201,197 short tons, was 2 per cent greater than production during the comparable 1945 quarter and 11 per cent greater than output of the preceding 1946 quarter. The third quarter output is nearly always greatest seasonwise, as both producers and consumers try to build up stocks to tide them through curtailed winter operations.

As usual, rotary oil-well drilling accounted for the bulk of shipments. Ground barite is used in drilling oil wells in high pressure formations to retain oil and gas at their levels. The heavily-weighted column of drilling mud thus prevents blow-outs. About 5 tons of barite is required for each 1,000 feet of high pressure drilling. In view of the estimated 7 per cent increase in high-pressure well-drilling in 1946 over 1945, grinders for the well drilling business expect 1946 to be the biggest year in their history.

Arkansas remained the State of greatest production with its two flotation plants, one operated by National Lead Co. and the other by Magnet Cove Barium Corp. Missouri was a close second. A considerable portion of the Missouri increase can be accounted for by the émigrés from the declining Cartersville, Ga., area. It is interesting to note that Missouri increased about 36,000 tons during the first nine months of 1946 over the same period of 1945, compared with a decrease of about 31,000 tons for Georgia. The influx of Georgia operators to Missouri seems definitely to have favored the national supply of barite.

Rayon and Nylon Battle For Hosiery Market



Record Mineral Output For 1946

The total value of minerals and mineral products produced in the United States and Alaska in 1946 reached an all-time peak, exceeding the former record of 1944 by 6 per cent, Secretary of the Interior J. A. Krug stated recently. On the basis of preliminary estimates prepared by the Bureau of Mines, their value in 1946 was $8,900,000,000.

Establishment of the new record, which surpassed the 1945 total valuation of

$8,143,000,000 by 9 per cent, resulted largely from the general advance in the prices of mineral commodities in 1946, according to the estimates submitted to R. R. Sayers, Bureau Director, by the Economics and Statistics Branch.

New production records were recorded for petroleum and natural gas, among the fuels; and for potash and phosphate rock, of the fertilizers.

Of the three major classes of mineral products—metals, fuels, and other nonmetals—only metals showed an over-all decline in value of output in 1946, this decline amounting to 4 per cent. Value of the fuels increased 9 per cent, and that for nonmetals, other than fuels, advanced 36 per cent. Gold was the only one of the principal metals to show a gain in 1946.

Rayon Shipments Dip

Rayon shipments during November totaled 70,500,000 pounds or 6 per cent below the October figure of 75,100,000 pounds. Eleven months' 1946 rayon deliveries have amounted to 772,200,000 pounds, 10 per cent greater than those in the corresponding 1945 period, according to Rayon Organon.

Compared with October, November deliveries of rayon filament yarn and staple were lower by 3 per cent and 17 per cent respectively.

November rayon filament yarn shipments amounted to 57,500,000 pounds (41,200,000 pounds of viscose+cupra and 16,300,000 pounds of acetate), while staple deliveries aggregated 13,000,000 pounds (9,400,000 pounds of viscose and 3,600,000 pounds of acetate).

Rayon stocks held by producers at the end of November increased over October levels. At the end of November producers held 8,200,000 pounds of viscose+cupra yarn, 1,800,000 pounds of acetate yarn, and 2,600,000 pounds of staple. These figures were +3 per cent, +6 per cent and no change respectively compared with stocks held at the end of October.

Enameled Metals Output Shaded

Shipments of porcelain enameled metal-base products showed a slight decrease in November, dropping to $7,814,134 from the year's high monthly figure of $8,142,556, according to the Porcelain Enamel Institute. Shortages of basic materials including steel enameling sheets were the most important factors causing the decline. Production, however, is near an all-time high level, with November's production nearly doubling the $4,012,810 volume reported by the industry during November 1945. Demand also remains at an all-time high and a continuing peak production throughout 1947 is anticipated.

Declines were fairly uniform in most product categories, although slight in-

PRODUCTION OF SYNTHETIC ORGANIC CHEMICALS

Chemical[1]	Unit of quantity	July 1946	August 1946	September 1946	October 1946
Acetanilid, tech. and U.S.P.	Lb.	....	493,197	....	1,134,531
Acetic acid:					
Synthetic	Lb.	23,907,485	24,383,068	21,933,741	24,980,326
Recovered	Lb.	99,522,121	94,679,656	96,836,421	110,563,661
Natural[2]	Lb.	2,423,495	2,676,437	2,655,615	2,806,758
Acetic anhydride[3]	Lb.	44,520,734	39,954,493	41,209,257	46,376,409
Acetone	Lb.	24,666,012	30,016,254	29,120,588	25,975,688
Acetylsalicylic acid	Lb.	572,337	459,677	573,785	710,143
Aniline	Lb.	8,213,302	8,326,193	6,316,897	8,924,437
Barbituric acid derivatives:[4]					
5-Ethyl-5-phenylbarbituric acid and salts (Phenobarbital)	Lb.	38,331	27,310	30,853	29,683
5-Ethyl-5-(1-methylbutyl)-barbituric acid and salts (Pentobarbital)	Lb.	....	3,012	....	n.a.
Benzene: (Benzol)					
Motor grade:					
Tar distillers[5]	Gal.	502,580	526,022	572,921	810,345
Coke-oven operators[6]	Gal.	3,082,148	3,220,789	2,862,437	3,099,833
All other grades:					
Tar distillers[5]	Gal.	1,381,563	1,142,284	1,423,526	1,208,588
Coke-oven operators[6]	Gal.	9,714,294	10,617,860	11,246,342	11,208,111
Butyl alcohol, primary, normal	Lb.	8,303,378	10,250,404	10,249,071	8,670,507
Carbon disulfide	Lb.	23,360,877	24,117,958	26,457,725	27,444,008
Carbon tetrachloride	Lb.	10,674,553	13,474,610	13,173,641	16,527,880
Chlorobenzene, mono	Lb.	20,887,731	22,157,017	21,549,759*	22,360,088
Creosote oil:					
Tar distillers[5]	Gal.	10,597,483	10,875,534	11,142,216	12,202,721
Coke-oven operators[6]	Gal.	2,529,843	2,991,576	2,765,474	4,148,976
Cresols:[7]					
Meta-para	Lb.	536,301	977,008	804,222	414,783
Ortho-meta-para	Lb.	1,063,308	739,052	380,909	832,095
Cresylic acid, refined[7 8]	Lb.	2,180,642	2,339,110	2,283,728	2,455,799
Dibutyl phthalate	Lb.	1,118,944	1,329,821	1,221,936	1,481,857
Dichlorodiphenyltrichloroethane (DDT)	Lb.	3,573,122	4,020,189	3,855,842	3,788,544
Dyes (commercial concentrations):					
C.I. 202 Chrome blue black R	Lb.	169,196	183,943	182,418	234,081
C.I. 581 Direct black EW	Lb.	851,750	756,266	745,046	840,972
C.I. 1114 Anthraquinone vat blue BCS 20%	Lb.	226,502	167,587	182,774	135,920
F.P. 302 Naphthol AS	Lb.	103,289	....	90,813	87,327
Ethyl acetate (85 percent)	Lb.	9,877,090	8,121,625	7,334,167	8,744,934
Ethyl ethers, tech. and U.S.P.	Lb.	3,448,050	3,585,867	3,079,223	3,003,670
Formaldehyde (37 percent by weight)	Lb.	38,094,994	38,149,391	36,735,289	41,863,814
Lakes: Peacock blue	Lb.	264,412	243,067	200,672	241,355
Methanol:					
Natural[9]	Lb.	1,326,054	1,303,844	1,220,784	1,464,220
Synthetic	Lb.	44,841,123	45,305,406	43,773,153	43,776,937
Naphthalene:					
Tar distillers:[5]					
Crude, solidifying at—					
Less than 79° C.	Lb.	17,505,571	16,177,971	17,203,040	17,351,924
Refined, solidifying at—					
79° C. and over	Lb.	7,372,423	7,501,829	8,154,983	8,752,881
Coke-oven operators:[6]					
Crude, solidifying at—					
Less than 79° C.	Lb.	7,320,652	7,771,396	7,537,392	8,425,254
Penicillin[4]	Million Oxford units.	2,292,287	2,100,362	2,214,209	2,633,629
Phenol (synthetic and natural) tech. and U.S.P.[7]	Lb.	13,492,879	14,812,191	13,734,526	18,369,252
Phthalic anhydride	Lb.	8,921,278	8,466,990	9,333,857	9,275,629
Styrene (Government owned plants only)	Lb.	32,835,374	33,200,339	30,613,972	29,960,223
Sulfa drugs:[4]					
Acetylsulfathiazole	Lb.	....	....	....	n.a.
Sulfanilamide	Lb.	....	....	....	n.a.
Sulfathiazole	Lb.	....	....	....	....
All other	Lb.	476,003	288,521	425,437	491,639
Tetramethylthiuram sulfides	Lb.	....	....	348,779	148,258
Toluene:					
Coke-oven operators[6]	Gal.	1,392,681	1,255,713	1,472,389	1,466,888
All other[5 10]	Gal.	1,050,287	1,482,622	1,270,104	2,444,278
Vitamins:[4]					
Ascorbic acid and salts:					
Quantity	Lb.	60,846*	55,893*	86,990	91,347
Value	....	n.a.	n.a.	n.a.	n.a.
Ergosterol, irradiated (Vitamin D_2):					
Quantity	Million U.S.P. units.	1,803,312	2,964,125*	2,593,642*	2,213,278
Value		n.a.	n.a.	n.a.	n.a.
Niacin and niacinamide:					
Quantity	Lb.	51,103	76,755*	82,810	95,183
Value	....	n.a.	n.a.	n.a.	n.a.
Pyridoxine (B_6):					
Quantity	Lb.	1,111	757	1,120	1,151
Value	....	n.a.	n.a.	n.a.	n.a.
Riboflavin for human consumption:					
Quantity	Lb.	....	....	....	....
Value	....	n.a.	n.a.	n.a.	n.a.
Thiamin chloride (B_1):					
Quantity	Lb.	13,831	16,860	15,056	16,344
Value	....	n.a.	n.a.	n.a.	n.a.
All other vitamins[11]					
Quantity	Lb.	n.a.	n.a.	n.a.	n.a
Value	....	n.a.	n.a.	n.a.	n.a

[1] Reported on the basis of 100 percent content of the specified material unless otherwise indicated.
[2] Natural acetic acid (produced by direct process from wood) and acetic acid distilled from calcium acetate as reported to the U. S. Bureau of the Census.
[3] Produced from ketene, acetylene, ethylene, and from acetic acid by the vapor phase process.
[4] Statistics are given in terms of bulk medicinals only.
[5] Produced by tar distillers from purchased coal tar only or from oil-gas or water-gas tar produced or purchased by tar distillers.
[6] Product of byproduct coke-oven operators only. These statistics are collected and compiled by the Coal Economics Division, U. S. Bureau of Mines.
[7] Statistics represent total production, from all sources including both data reported by coke-oven operators to the Coal Economics Division, Bureau of Mines and that reported by distillers of purchased coal tar to the U. S. Tariff Commission.
[8] Includes refined cresylic acid derived from petroleum.
[9] Reported to the U. S. Bureau of the Census.
[10] Includes toluene produced from petroleum by any process.
[11] Includes panthothenic acid and salts, ribotlavin for animal use, irradiated animal sterols, menadiones and other vitamins for which statistics are not shown.

Note—n.a. signifies information is not available. A dash (....) indicates either the statistics are confidential because publication would reveal operations of individual companies, or the data which had been received at the time of publication of this report were not indicative of total production. * Revised.

creases were registered in unclassified products and utensils. With these exceptions, porcelain enameled stove parts continned to hold the lead as the biggest individual product classification, closely followed by washing machine parts, table tops, and related cabinet parts and refrigerator parts. Architectural porcelain enameled parts have shown the greatest volume improvement of any category since 1945 as a direct result of increased building and remodeling.

New High in Fertilizer Tag Sales

On the basis of fertilizer tax tag sales, an all-time high in the volume of fertilizer consumption seems to have been reached in 1946. Fertilizer tag sales for the year just ended totaled 9,276,000 equivalent short tons; this represented an increase of 18 percent over sales in 1945, and 92 percent over the 1935-1939 average, according to The National Fertilizer Association.

Since 1936, the volume of tag sales, in equivalent tons, has increased each year, except for a slight drop in 1938, to the new high level of 1946. The tonnage for the 16 reporting States in 1946 was greater than the total United States fertilizer consumption for any year through 1941.

Each of the 16 States that require tax tags showed an increase in 1946 sales over 1945 sales; the States with the greatest percentage increases were Oklahoma, Missouri and Texas.

Wage Rates Hold

Weekly earnings in manufacturing industries in November continued to average about $45.50 for the third successive month, according to preliminary estimates released by the Bureau of Labor Statistics of the U. S. Department of Labor. This average is about $5 per week more than in November of last year although the average workweek is about one hour shorter.

Superphosphate Output Holds Up Well

In November 1946 the production of superphosphate, basis 18 percent available phosphoric acid, for the 120 plants whose operations are reported to The National Fertilizer Association amounted to 493,000 short tons. This total is equal to the production for October 1946 and is slightly more than the amount produced in November 1945.

The total amount of superphosphate produced during January-November 1946 was 5,091,000 short tons. This represents a decrease of less than 1 percent from the similar period of 1945.

Superphosphate, basis 18 percent A. P. A., disposed of during November 1946 totaled 445,000 short tons, bringing the total superphosphate disposed of for the first 11 months of 1946 to 5,329,000 short tons. Shipments of superphosphate during this period were 5 percent below the corresponding period in 1945, but the amount used in mixed goods was 16 percent greater.

End of the month stocks of superphosphate, basis 18 percent A. P. A., amounted to 439,000 short tons, an increase of 13 percent over the stocks at the end of the previous month. Stocks at the end of November 1946, however, were 28 per-

CHEMICALS

UNITED STATES PRODUCTION, November 1946

Description

Statistics on the production of chemicals shown in the following table are a continuation of the series initiated with the report of February 7, 1944, in "Facts for Industry," Series 6-1-1 which covered the years 1941-1943. With the end of the war, the list of chemicals covered was reviewed and those presented here were selected for continuation. While considerably curtailed, this group of chemicals and gases is fairly representative of the products of the inorganic chemicals industry and provides sufficient information for gauging the broad changes in operations from month to month. This list is subject to change if future developments indicate that additional chemicals should be covered or that certain of those on which data are now published have relatively small interest. The figures shown here represent the primary production of the various chemicals in the United States, including quantities produced for further processing in the same plant, for intra-company transfer and for sale. Data on consumption and stocks in producing plants, included in this release through September 1945 are no longer collected.

Chemical and Basis	Unit	Primary Production	
		November	October
Ammonia, synthetic anhydrous[1]	Short tons	80,380	80,829
Ammonium nitrate, original solution (100% NH_4NO_3)[2]	Short tons	81,733	85,554
Ammonium sulfate, synthetic (technical)[3]	M pounds	26,021	23,152
Calcium arsenate (100% $Ca_3(AsL_4)_2$)	M pounds	1,330	1,916
Calcium carbide (commercial)	Short tons	55,312	57,074
Calcium phosphate:			
Monobasic (100% $CaH_4(PL_4)_2$)	M pounds	7,109	7,305
Dibasic (100% $CaHIO_4$)	M pounds	5,624	5,077
Carbon dioxide:			
Liquid and gas	M pounds	15,437	19,984*
Solid (dry ice)	M pounds	46,611	54,906
Chlorine[4]	Short tons	97,186	108,174*
Chrome green (C.P.)	M pounds	1,265	1,378
Chrome yellow and orange (C.P.)	M pounds	3,083	3,168*
Hydrochloric acid (100% HCl)	Short tons	30,150	32,394
Hydrofluoric acid:			
Anhydrous and technical (100% H_2F_2)	M pounds	3,990	3,807
Hydrogen	Millions of cubic feet	1,525	1,561*
Lead arsenate (acid and basic)	M pounds	2,865	2,259
Methanol (natural) (100% CH_3OH)	M gallons	210	221
Molybdate chrome orange (C.P.)	M pounds	286	435*
Nitric acid (100% HNO_3)	Short tons	63,277	61,686
Oxygen	M cu. ft.	1,005,544	1,061,154
Phosphoric acid:			
Total (50% H_3PO_4)[5]	Short tons	82,419	80,673
From phosphorous (50% H_3PO_4)	Short tons	43,296	43,098
From phosphate rock (50% H_3PO_4)[5]	Short tons	39,123	37,575*
Silica gel:			
Desiccant and aviation gas catalyst grades	M pounds	3,948	3,087
Silver nitrate (100% $AgNO_3$)	M ozs.	5,043	5,274
Soda ash (commercial sodium carbonate):			
Ammonia soda process—			
Total wet and dry (98-100% Na_2CO_3)[6]	Short tons	368,302	382,026
Finished light (98-100% Na_2CO_3)[7]	Short tons	176,446	188,119
Finished dense (98-100% Na_2CO_3)	Short tons	136,626	137,295
Natural[8]	Short tons	15,357	20,756*
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	15,580	16,242
Sodium bichromate and chromate	Short tons	7,159	7,066
Sodium hydroxide (caustic soda)[9]	Short tons	92,531	105,172*
Electrolytic process—			
Liquid (100% NaOH)	Short tons	92,531	105,172*
Solid (100% NaOH)	Short tons	13,848	19,217
Lime-soda process—			
Liquid (100% NaOH)	Short tons	60,751	63,536
Solid (100% NaOH)	Short tons	20,374	20,125
Sodium phosphate:			
Monobasic (100% NaH_2PO_4)	Short tons	986	988
Dibasic (100% Na_2HPO_4)	Short tons	5,676	5,253
Tribasic (100% Na_3PO_4)	Short tons	6,596	7,756
Meta (100% $NaPO_3$)	Short tons	2,012	2,239
Tetra (100% $Na_4P_2O_7$)	Short tons	4,428	4,789
Sodium silicate:			
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	34,442	41,188
Sodium sulfate:			
Anhydrous (refined) (100% Na_2SO_4)[10]	Short tons	9,229	10,422
Glauber's salt (100% $Na_2SO_4.10H_2O$)[8]	Short tons	15,242	15,316
Salt cake (crude) (commercial)[8 10]	Short tons	37,239	48,367
Sulfuric acid:			
Total (100% H_2SO_4)[11]	Short tons	849,711	834,215
Chamber process (100% H_2SO_4)	Short tons	274,969[12]	273,985[12]
Contact process (gross) (100% H_2SO_4)[13]	Short tons	574,742[14]	561,130[14]
Contact process (new) (100% H_2SO_4)[13]	Shrt tons	526,858[14]	515,307[14]
Fortified spent acid (100% H_2SO_4)	Short tons	47,884	45,823
Zinc yellow (zinc chromate) (C.P.)	Short tons	203	291

* Revised.

[1] Data for a small amount of aqua ammonia are included in the figures reported by one company.

[2] Includes that material to be further processed to grained ammonium nitrate.

[3] Excludes by-product coke oven production of ammonium sulfate which is published monthly by the Bureau of Mines in the Monthly Coke Report.

[4] Represents total production of gas, including quantities liquefied for use, storage or shipments.

[5] Revised data prior to August will be shown in a forthcoming release in this series. See footnote 6, Series M19A-86.

[6] Includes quantities diverted to manufacture of caustic soda and sodium bicarbonate and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.

[7] Excludes quantities converted to finished dense soda ash.

[8] Collected in cooperation with Bureau of Mines.

[9] Liquid production figures represent total production for each process including quantities later evaporated to solid caustic and reported as such.

[10] Revised October 1945—April 1946. See footnote 9, 10, and 11 in "Facts for Industry," Series M19A-66 for June 1946.

[11] Includes sulfuric acid of oleum grade. Beginning January 1946, includes estimates of by-product operations of eight smelters formerly reporting to the Bureau of Mines. See footnotes 12 and 14.

[12] Proportion of estimates, 7 percent.

[13] Includes sulfuric acid of oleum grade.

[14] Proportion of estimate from 2.0 to 2.5 percent.

(Source: Bureau of the Census)

cent less than those reported for November 1945. Stocks at the end of November 1946 were 11 percent below production and the ratio of stocks to production has declined each November for the past three years.

Zinc Output Declines and Stocks Dip

During October the zinc industry showed a continued over-all decline in stocks in contrast to gains in production, shipments, and receipts, according to the Bureau of Mines, United States Department of the Interior.

Producers' stocks of zinc oxide and inventories of slab zinc at domestic smelters and at consumers' plants continued to decline. Zinc dust on hand at producers' plants remained virtually unchanged at the end of October.

Production of zinc oxide, zinc dust and slab zinc rose in October. Total outputs of zinc oxide and zinc dust were 3 percent and 13 percent, respectively, above the monthly averages for the first 10 months of 1946.

Brazil's Mining Code Available

An English translation of the Brazilian Mining Code, expected to be of interest to the nation's mineral industries, is being made available by the Bureau of Mines. This is the first time since 1930 that the Bureau has published an English copy of a foreign mining law.

A free copy of the Brazilian Mining Code may be obtained from the Bureau of Mines, Department of the Interior, Washington 25, D. C., by requesting the supplement to the Mineral Trade Notes for November, 1946.

WOOD CHARCOAL

January 1, 1944—June 30, 1945
(*Short tons*)

Use	Amount	Percent
Total Allocations	*444,100*	*100.0*
Direct military[1]	622	0.1
Export	836	0.2
Other uses	*442,642*	*99.7*
Metallurgy and mining	*217,068*	*48.9*
Alloys	89,295	20.1
Pig iron	35,435	8.0
Copper, brass, and bronze	31,063	7.0
Case hardening and treating	21,311	4.8
Steel	15,313	3.4
Drying foundry moulds	11,668	2.6
Aluminum, nickel, and U. S. Mint	6,240	1.4
Foundries	5,719	1.3
Cobalt, manganese molybdenum	436	0.1
Powdered iron	336	0.1
Mining	252	0.1
Carbon bisulfide	69,553	15.7
General domestic	23,299	5.3
Activated carbon	18,097	4.0
Poultry and stock food	15,751	3.5
Tobacco curing	13,156	3.0
Railroad dining cars	11,668	2.6
Black powder	10,091	2.3
Carheating stockpile	9,068	2.0
Acetylene gas cylinders	5,842	1.3
Tinners, roofers, and plumbers	4,125	0.9
Laundries	3,739	0.8
Welding	3,111	0.7
Meat and fish curing	2,598	0.6
Glass	1,398	0.3
Graphite and processed carbon	1,121	0.3
Shipyards	814	0.2
Aircraft	627	0.2
Miscellaneous uses and small orders	31,516	7.1

[1] End-use data not available.

LACTIC ACID

October 1, 1944—March 31, 1945
(*Thousands of pounds 100% basis*)

Use	Amount	Percent
Total Allocations	*5,899*	*100.0*
Direct military[1]	2,292	40.7
Export	179	3.0
Other uses	3,428	56.3
Food processing	592	10.0
Leather processing	506	8.6
Beverages	413	7.0
Plastics	153	2.6
Textile processing	114	1.9
Adhesives	93	1.6
Sodium lactate	79	1.4
Medicinals and pharmaceuticals	22	0.4
Miscellaneous and small orders	1,456	22.8

[1] End-use data not available.

POTASSIUM CHLORATE

January 1, 1944—June 30, 1945
(*Thousands of pounds*)

Use	Amount	Percent
Total Allocations	*35,478*	*100.0*
Direct military[1]	4,626	13.0
Export	3,746	10.6
Other uses	27,106	76.4
Matches	25,142	70.9
Chemical heat pads	742	2.1
Commercial explosives	504	1.4
Pharmaceuticals and medicinals	99	0.3
Miscellaneous uses and small orders	619	1.7

[1] End-use data not available.

HYDROGEN PEROXIDE

July 1, 1944—June 30, 1945
(*Thousands of pounds—100 volume basis*)

Use	Amount	Percent
Total Allocations	*29,440*	*100.0*
Direct military[1]	8,535	29.0
Export	234	0.8
Other uses	20,671	70.2
Textile processing	10,402	35.3
Chemical processing	2,727	9.3
Drugs and cosmetics	1,155	3.9
Fur treatment	517	1.8
Bleaching	270	0.9
Resale and small orders[2]	3,829	13.0
Miscellaneous[3]	1,771	6.0

[1] End-use data not available.
[2] Distributed to "Other uses."
[3] Includes quantities for foods, gelatin, lanolin, lecithin, and soap processing.

BARIUM CARBONATE (PRECIPITATED)

July 1, 1944—June 30, 1945
(*Short tons—100% basis*)

Use	Amount	Percent
Total Allocations	*21,261*	*100.0*
Direct military[1]	7,888	37.1
Export	86	0.4
Other uses	13,287	62.5
Ceramic brick and clay	4,184	19.7
Chemicals	2,187	10.3
Glass manufacturing	1,882	8.9
Metal heat treating	2,053	9.6
Oil well drilling	2,015	9.5
Miscellaneous uses and small orders	966	4.5

[1] End-use data not available.

POTASSIUM BICHROMATE

January 1, 1944—June 30, 1945
(*Thousands of pounds, 100% $K_2Cr_2O_7$*)

Use	Amount	Percent
Total Allocations[1]	*10,258*	*100.0*
Export	1,623	15.8
Other uses	8,635	84.2
Pigments	4,479	43.7
Metallurgical uses	757	7.4
Metal treating	570	5.6
Corrosion prevention	187	1.8
Chemical manufacture[1]	513	5.0
Textile processing	420	4.1
Tanning	73	0.7
Miscellaneous uses and small orders	2,393	23.3

[1] Excludes potassium bichromate used in the manufacture of other primary chromium chemicals.

SODIUM BICHROMATE

January 1, 1944—June 30, 1945
(*Thousands of pounds—100% $Na_2Cr_2O_7 \cdot 2\ H_2O$*)

Use	Amount	Percent
Total Allocations[1]	*192,050*	*100.0*
Export	3,407	1.8
Other uses	189,552	98.2
Pigments	82,222	42.6
Chemical manufacture[1]	30,353	15.8
Tanning	30,076	15.6
Metallurgical uses	15,964	8.2
Metal treatment	13,844	7.1
Corrosion prevention	2,120	1.1
Textile processing	11,661	6.0
Miscellaneous uses and small orders[2]	19,276	10.0

[1] Excludes sodium bichromate used in the manufacture of other primary chromium chemicals.
[2] Includes metal alloys.

PYRIDINE

January 1, 1944—June 30, 1945

	Amount	Percent
TOTAL ALLOCATIONS	*3,040*	*100.0*
Direct military[1]	1	
Exports	51	1.7
Other uses	*2,007*	*98.3*
Vitamins	1,288	42.3
Sulfa drugs	646	21.8
Rubber chemicals	386	12.7
Water repellants	211	6.9
Other medicinals	107	2.8
Disinfectants	71	2.3
Dyestuffs	59	1.9
Miscellaneous uses and small orders	231	7.6

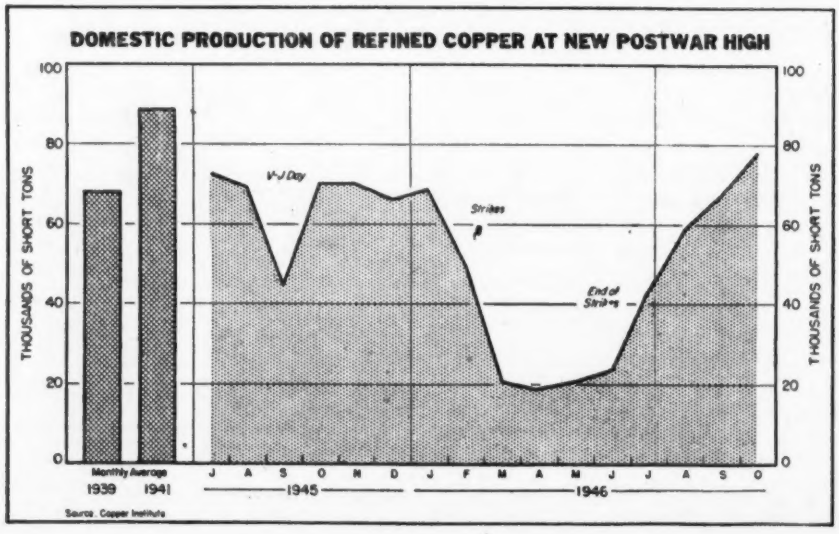
[1] End-use data not available.
[2] Less than one-tenth of one percent.

DIETHYL PHTHALATE

January 1, 1944—June 30, 1945
(Thousands of pounds)

	Amount	Percent
TOTAL ALLOCATIONS	*9,244*	*100.0*
Direct military[1]	3,218	34.8
Foreign	4	[2]
Other uses	*6,022*	*65.2*
Protective coatings and plastics	5,544	60.0
Photographic film	357	3.9
Denaturants	54	0.6
Miscellaneous uses and small orders[3]	67	0.7

[1] End-use data not available.
[2] Less than one-tenth of one percent.
[3] Includes small amounts used for inks, cable impregnation, and soap manufacture.



	Current		1947		1946	
	Low	High	Low	High	Low	High
Barium Carbonate precip, wks, bgs.....ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1.....ton	80.00	95.00	73.00	95.00	73.00	78.00
Barytes, floated, paper bgs..ton	....	41.95	....	41.95	....	41.95
Bauxite, bulk mines.....ton	8.50	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms.lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd.....gal.	....	.17	....	.17	....	.17
Benzyl Chloride, cbys.....lb.	.20	.21	.20	.21	.20	.24
Beta-Naphthol, tech, bbls, wks.....lb.	.23	.25	.21	.25	.21	.24
Bismuth metal, ton lots.....lb.	....	1.80	....	1.80	1.25	1.80
Blanc Fixe, 66⅔% Pulp, bbls, wks.....ton *h*	40.00	40.50	40.00	40.50	40.00	46.50
Bleaching Powder, wks. 100 lbs.	2.50	3.10	2.50	3.10	2.50	3.60
Borax, tech, c-l, bgs.....ton *i*	48.50	51.00	45.00	51.00	....	45.00
Bordeaux Mixture, drs.....lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases.....lb.	.21	.23	.21	.23	.21	.23
Butyl, acetate, norm. drs....lb.	.26	.26½	.26	.26½	.1860	.26½
Cadmium Metal.....lb.	....	1.55	....	1.55	.90	1.55
Calcium, Acetate, bgs..100 lbs.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs.....ton	50.00	90.00	50.00	90.00	50.00	90.00
Carbonate, c-l bgs.....ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs, c-l...ton	21.50	38.00	18.50	38.00	18.50	38.00
Solid, 73-75% drs, c-l....ton	21.00	37.50	18.00	37.50	18.00	37.50
Cy'n'd, min. 21% N, c.l...lb.	.02¼	.02¾	.02¼	.02¾	....	....
Gluconate, USP, drs.....lb.	.58	.65	.57	.65	.57	.59
Phosphate, tri, bbls, c-l...lb.	....	.0635	....	.0635	....	.0635
Camphor, USP, gran, powd, bbls.....lb.	.81	.82	.81	.82	.69	.82
Carbon Bisulfide, 55-gal. drs.lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl.....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms.....lb.	.06	.06½	.06	.06½	.69	.80
Casein, Acid Precip, bgs, 10,000 lbs. or more.....lb.	no prices		no prices		.24	.33
Chlorine, cyls, lcl, wks, contract.....lb.	....	.07¼	....	.07¼	....	.07¼
cyls, c-l, contract.....lb. *j*	....	.05¼	....	.05¼	....	.05¼
Liq. tk, wks, contract. 100 lbs.	....	2.30	....	2.30	....	2.30
Chloroform, tech, drs.....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude.....bbl.	8.50	9.00	8.50	9.00	8.25	9.00
Cobalt, Acetate, bbl.....lb.	....	.83¾	....	.83¾	....	.83¾
Oxide, black kgs.....lb.	....	1.84	....	1.84	....	1.84
Copper, metal.....100 lbs.	....	19.50	....	19.50	12.00	14.75
Carbonate, 52-54%, bbls...lb.	.23	.24	.19½	.24	.19½	.20½
Sulfate, bgs, wks cryst. .....100 lbs.	7.10	7.25	7.10	7.25	5.00	7.25
Copperas, bulk, c-l, wks....ton	....	14.00	....	14.00	....	14.00
Cresol, USP, drs.....lbs.	.13¾	.14¼	.13¾	.14¼	.10¾	.14¼
Dibutylamine, c-l, drs, wks..lb.	....	.76	....	.76	....	.66
Dibutylphthalate, drs.....lb.	.29	.29½	.29	.29½	.17	.29½
Diethylaniline, drs.....lb.	....	.48	....	.48	....	.48
Diethyleneglycol, drs, wks...lb.	.14	.15	.14	.15	.14	.15
Dimethylaniline, dms, cl., lcl.lb.	.20	.22	.20	.22	.21	.22
Dimethyl phthalate, drs.....lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenzene, bbls.....lb.	....	.16	....	.16	....	.18
Dinitrochlorobenzene, dms..lb.	....	.14	....	.14	....	.14
Dinitrophenol, bbls.....lb.	....	.22	....	.22	....	.22
Dinitrotoluene, dms.....lb.	....	.18	....	.18	....	.18
Diphenyl, bbls lcl, wks.....lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls.....lb.	....	.25	....	.25	....	.25
Diphenylguanidine, drs.....lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, syn. 85-90% tks, frt. all'd.....lb.	....	.09½	....	.09½	....	.09½
Chloride, USP, bbls.....lb.	.20	.22	.18	.22	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms.....lb.	.0891	.0941	.0891	.0941	.0842	.0941
Gylcol, dms, cl.....lb.	....	.10	....	.10	....	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines.....ton	....	37.00	....	37.00	....	37.00
Formaldehyde, bbls, cl & lcl..lb.	.0595	.0645	.0520	.0645	.0520	.0570
Furfural tech, dms, c-l, wks..lb.	....	.13	....	.13	....	.13
Fusel Oil, ref'd, dms, dlvd...lb.	.26	.26½	.18½	.26½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks.....100 lbs.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l, lb.	.55¼	.75¾	.55¼	.75¾	.17½	.55¼
Crude Saponification, 88% to refiners tks.....lbs.	.45	.60	.45	.60	....	.60

GUMS

Gum Arabic, amber sorts bgs .....lb.	.13¾	.14	.13¾	.14	.11¾	.14½
Benzoin, Sumatra, cs.....lb.	.90	1.00	.90	1.00	.52	1.70
Copal, Congo.....lb.	no prices		.... no stocks			.55¾
Copal, East India, chips....lb.	no prices		.... no stocks			.55¾
Macassar dust.....lb.	no prices		.... no stocks			.07⅜
Copal Manila.....lb.	no prices		.25	....	.13½	.25
Copal Pontianak, bold c-l....lb.	no prices		.... no stocks			.17⅜
Karaya, bbls, bxs, dms.....lb.	.21	.50	.21	.50	.18	.50

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
January, 1945, $0.890 January, 1946, $0.857
January, 1947, $0.661

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Acetaldehyde, 99%, drs.wks..lb.	.11	.15	.11	.15	.11	.14
Acetic Anhydride, drs.....lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv.....lb.	.07	.10	....	.10	.06	.07
ACIDS						
Acetic, 28% bbls.....100 lbs.	3.78	4.03	3.38	4.03	3.38	3.63
Glacial, bbls.....100 lbs.	10.65	10.90	9.15	10.90	9.15	9.40
dms, wks.....100 lbs.	13.20	13.75	6.93	13.75	6.93	7.25
Acetylsalicylic, Standard USP.....lb.	.45	.59	.45	.59	.40	.59
Benzoic, tech, bbls.....lb.	.43	.47	.43	.47	.43	.47
USP, bbls., 4,000 lbs. up..lb.	....	.54	....	.54	....	.54
Boric tech, bbls, c-l.....tons *a*	....	109.00	....	109.00	....	109.00
Chlorosulfonic, drs, wks.....lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.....lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal.....gal.	1.01	1.04	1.01	1.04	.81	1.04
Formic, 85%-90% cbys.....lb.	.10½	.14½	.10	.14½	.10	.13
Hydrofluoric, 30% rubber, dms. .....lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls, wks...lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls, wks.....lb.	.073	.075	.073	.0755	.073	.0755
Maleic, Anhydride, drs.....lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys.....100 lbs.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks....100 lbs.	....	1.75	....	1.75	....	1.75
22° cbys, c-l, wks....100 lbs.	....	2.25	....	2.25	....	2.25
Nitric, 36°, cbys, wks..100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks...100 lbs. *c*	....	5.50	....	5.50	....	5.50
40°, c-l, cbys, wks...100 lbs. *c*	....	6.00	....	6.00	....	6.00
42°, c-l, cbys, wks...100 lbs. *c*	....	6.50	....	6.50	....	6.50
Oxalic, bbls, wks.....lb.	.13	.14	.11¾	.14	.11¼	.14½
Phosphoric, 100 lb. cbys, USP.....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls.....lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks.....ton	....	13.00	....	13.00	....	13.00
66°, tks, wks.....ton	....	16.50	....	16.50	....	16.50
Fuming 20% tks, wks....ton	....	19.50	....	19.50	....	19.50
Tartaric, USP, bbls.....lb.	.54½	.55	.54½	.55	.54½	.71
Alcohol, Amyl (from Pentane) tks, delv.....lb.	....	15.1	....	15.1	....	.131
Butyl, normal, syn, tks....lb.	....	.14½	....	.14½	....	.14½
Denatured, CD 14, c-l drs.....gal. *d*	....	.89½	....	.89½	....	.90
Denatured, SD, No. 1, tks. *d*	....	.82½	....	.82½	....	.82½
Ethyl, 190 proof tks.....gal.	....	17.94	....	17.94	....	17.94
Isobutyl, ref'd, drs.....lb.	....	.0860	....	.0860	....	.0860
Isopropyl ref'd, 91%, dms.....gal.	.40½	.41	.44	.47	.38	.47
Alum, ammonia, lump, bbls, wks.....100 lbs.	....	4.25	....	4.25	....	4.25
Aluminum, 98.99%....100 lbs.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd, l.c.l. wks..lb.	....	.10¾	....	.10¾	.09	.12
Hydrate, light, bgs.....lb.	....	.14½	....	.14½	....	.14½
Sulfate, com'l, bgs, wks, c-l.....100 lbs.	1.15	1.20	1.15	1.20	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lbs.	1.75	2.00	1.75	2.00	1.75	2.00
Ammonia anhyd, cyl.....lb.	....	.14½	....	.14½	....	.14½
Ammonia, anhyd, fert, tank cars, wks, frt. equalized...ton	....	59.00	....	59.00	....	59.00
Ammonium Carbonate, USP, lumps, dms.....lb.	.08¼	.09½	.08¼	.09½	.08¼	.09½
Chloride,whi,bbls,wks,100lbs.	4.75	5.00	4.45	5.15	4.45	5.15
Nitrate, tech, bgs, wks....lb.	.0435	.0450	.0435	.0450	.0435	.0850
Oxalate pure, grn, bbls....lb.	....	.23	....	.23	....	.23
Perchlorate, kgs.....lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech, bgs.....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Stearate, anhyd, dms.....lb.	....	.34	....	.34	....	.34
Sulfate, dms, bulk.....ton	....	30.00	....	30.00	28.20	30.00
Amyl Acetate (from pentane) tks, delv.....lb.	....	21.0	....	21.0	....	.181
Aniline, Oil, drs.....lb.	.12	.13	.12	.13	.11½	.13
Anthraquinone, sub, bbls....lb.	....	.70	....	.70	....	.70
Antimony Oxide, bgs.....lb.	.23	.26	.21	.26	.15	.21¼
Arsenic, whi, bbls, powd.....lb.	.06	.08	.05	.08	.04	.05¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Saltpeter, grn. bbls.....100 lbs.	8.20	9.00	8.20	9.00	8.20	9.00
Shellac, blchd. bone dry, bbls.....lb.	.71	.74½	.71	.74½	.42½	.74½
Silver Nitrate, bots, 2,500-oz. lots.....oz.	.53¾	.54½	.53¾	.59	.47	.59
Soda Ash, 58% dense, bgs, c-l, wks.....100 lbs.	....	1.28	....	1.28	....	1.28
58% light, bgs cl.....100 lbs.	....	1.20	....	1.20	1.05	1.20
Caustic, 76% flake drms, cl.....100 lbs.	2.90	3.00	2.90	3.00	....	3.00
76% solid, drms, cl. 100 lbs.	2.50	2.75	2.50	2.75	....	2.75
Liquid, 47-49%, sellers, tks.....100 lbs.	....	2.10	....	2.10	....	2.10
Sodium Acetate, anhyd. dms.....lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms.....lb.	.46	.52	.46	.52	.46	.52
Bicarb, USP, gran., bgs., cl., works.....100 lbs.	2.25	2.59	2.25	2.59	1.55	2.59
Bichromate, bgs, wks l.c.l..lb.	.08⅜	.08⅞	.07⅞	.08⅜	.07⅞	.08⅛
Bisulfate powd, bbls, wks.....100 lbs.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks.....100 lbs.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.....lb.	....	.06½	....	.06½	....	.06¼
Cyanide, 96-98%, dms....lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, dms...lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks.....100 lbs.	....	2.25	....	2.25	....	2.25
Metasilicate, gran, bbl, wks c-l.....100 lbs.	....	3.40	....	3.40	....	3.40
Nitrate, imp, bgs.....ton	....	41.50	....	41.50	33.00	38.50
Nitrite, 96-98% bbl. cl....lb.	....	.06¾	....	.06¾	....	.06¾
Phosphate, dianhyd. bgs, wks.....100 lbs.	6.00	6.75	6.00	6.75	6.00	6.75
Tri-bgs, cryst, wks. 100 lbs.	2.70	3.10	2.70	3.10	2.70	3.10
Prussiate, yel. bbls, wks...lb.	....	.12¼	....	.12¼	....	.11
Silicate, 52°, drs, wks...100 lbs.	1.55	2.00	1.40	2.00	1.40	1.80
40°, drs, wks, c-l...100 lbs.	.95	1.15	....	1.15	....	.80
Silicofluoride, bbls, NY...lb.	.06½	.07½	.06½	.07½	.06½	.10
Sulfate tech, Anhyd, bgs.....100 lbs.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks.....100 lbs.	....	2.90	....	2.90	....	2.40
Solid, bbls, wks.....lb.	3.65	4.50	3.15	4.50	3.15	3.90
Starch, Corn, Pearl, bgs. 100 lbs.	....	4.02	....	4.321	4.321	6.271
Potato, bgs, cl.....lb.	.0745	.07½	.0735	.0760	.0735	.0760
Rice, bgs.....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs.....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines.....ton	....	16.00	....	16.00	....	16.00
Flour, USP, precp, bbls, kgs.....lb.	.18	.36	.18	.36	.18	.36
Roll, bbls.....100 lbs.	2.65	3.40	2.65	3.40	2.40	3.40
Sulfur Dioxide, liquid, cyl...lb.	....	.085	.07	.08	.07	.08
tks, wks.....lb.	....	.044	....	.04	....	.04
Talc, crude, c-l, NY.....ton	....	15.00	....	15.50	....	15.50
Ref'd, c-l, NY.....ton	....	17.50	....	17.50	13.00	21.00
Tin, crystals, bbls, wks.....lb.	no stocks		no stocks		no stocks	
Metal.....lb.	....	.70	....	.70	....	.70
Toluol, drs, wks.....gal.	....	.27	....	.27	.27	.32
tks, frt all'd.....gal.	....	.22	....	.22	.22	.27
Tributyl Phosphate, dms lcl. frt all'd.....lb.	....	.65	....	.65	....	.65
Trichloroethylene, dms, wks.lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks.....lb.	....	.32	....	.32	....	.32
Triethylene glycol, dms.....lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos., bbls.....lb.	.26	.27	.26	.32	.26	.32
Urea, pure, cases.....lb.	....	.12	....	.12	....	.12
Wax, Bayberry, bgs.....lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes.....lb.	.68	.70	.68	.70	.60	.70
Candelilla, bgs, crude.....lb.	.78	.80	.77	.80	.62	.86
Carnauba No. 1, yellow, bgs, ton.....lb.	1.90	1.92	1.90	2.00	1.80	2.04
Xylol, Indus., frt all'd, tks, wks.....gal.	....	.22	....	.22	....	.26
Zinc Chloride tech, fused, wks.....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer., bgs, wks....lb.	.09	.09¼	.09	.09¼	.07	.09¼
Sulfate, crys, bgs....100 lbs.	3.40	4.15	3.40	4.15	3.40	4.15
Babassu, tks.....lb.	no prices		no prices		.11	.12
Castor, No. 3, dms, c.l.....lb.	....	.31¼	....	.31¼	....	.29¾
China Wood, drs, spot NY..lb.	.39½	.41	.39½	.41	.39	.41
Coconut, edible, drs NY....lb.	no prices		no prices		....	.0985
Cod, USP, bbls, dms.....gal.	2.60	3.80	2.60	3.80	2.15	3.80
Corn, crude, tks, wks.....lb.	.28	.28½	.27	.28½	....	.27
Linseed, Raw, dms, -cl.....lb.	.3660	nom.	.3580	.3660	.1680	.3640
Menhaden, crude tks.....	no prices		.21½	nom.	.1220	.21½
Light, pressed, drs l.c.l....lb.	....	.29	....	.29	.1300	.29
Palm, Niger, dms...:.....lb.	no prices		no prices		....	.0865
Peanut, crude, tks, f.o.b. wks.lb.	....	.28½	.28	.28½	.12⅞	.28½
Perilla, crude, dms, NY.....lb.	no stocks		no stocks		no stocks	
Rapeseed, bulks.....lb.	no prices		....no prices		....	.13
Red, dms.....:.....lb.	.29¾	.30¾	.29¾	.30¾	.13¼	.30¾
Soy Bean, crude, tks, wks...lb.	....	.27½	.26½	.27½	.1175	.2450
Tallow, acidless, dms....:..lb.	....	.27	....	.27	....	.14¼

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Kauri, N. Y.						
Superior Pale XXX....lb.	no prices		....	nom.	....	.65¾
No. 3....lb.	no prices		....	nom.	....	.22
Sandarac, bgs....lb.	.90	.95	.90	.95	.90	.99½
Tragacanth, No. 1, cases....lb.	5.00	5.25	5.00	5.25	3.75	5.25
No. 3....lb.	3.20	3.45	3.20	3.45	2.10	3.45
Yacca, bgs....lb.	no prices		....	nom.	.05	.07¼
Hydrogen Peroxide, cbys....lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars....lb.	....	2.10	....	2.10	1.75	2.10
Lead Acetate, cryst, bbls....lb.	....	.17¾	....	.17¾	....	.16¾
Arsenate basic, bg, lcl....lb.	.21	.22	....	.18	.12	.18
Nitrate, bbls....lb.	....	.15¾	....	.15¾	....	.12½
Red, dry, 95% Pb_3O_4 bbls....lb.	.15	.16¾	.14¼	.16¾	.09	.16
97% Pb_3O_4, bbls delv...lb.	.15½	.17	.15	.17	.09½	.16¾
98% Pb_3O_4, bbls delv...lb.	.16	.17¼	.15¼	.17¼	.08¼	.17
White, bbls....lb.	.13¾	.14¼	.13	.14¼	.07¼	.14¼
Basic sulfate, bbls, lcl...lb.	.13¼	.13½	.12½	.13¼	.07¼	.13¼
Lime, Chem., wks, bulk....ton	6.50	10.25	6.50	10.25	6.50	10.25
Hydrated, f.o.b. wks....ton	8.50	12.00	8.50	12.00	8.50	12.00
Litharge, coml, delv. bbls....lb.	.13¾	.15¾	.13	.15¾	.08	.15¼
Lithopone, ordi., bgs....lb.	.05	.05¼	.05	.05¼	.04¼	.05¼
Magnesium Carb, tech, wks..lb.	.07¼	.10¼	.07¼	.10¾	.07¼	.10¾
Chloride flake, bbls, wks c-l....ton	....	37.00	....	37.00	....	32.00
Manganese, Chloride, Anhyd. bbls....lb.	.14	.16	.14	.16	.14	.18
Dioxide, Caucasian bgs, lcl....ton	74.75	79.75	74.75	79.75	74.75	79.75
Methanol, pure, nat, drs..gal. *l*	.63	.73	.63	.73	.63	.73
Synth, drs cl....gal. *m*	.31	.38	.31	.38	.24	.38
Methyl Acetate, tech tks....lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv..lb.	.09½	.10½	.09½	.10½	.09½	110½
Chloride, cyl....lb.	.32	.36	.32	.36	.32	.40
Ethyl Ketone, tks, frt all'd..lb.	....	.08	....	.09	....	.09
Naphtha, Solvent, tks....gal.	....	.22	....	.22	....	.27
Naphthalene, crude, 74°, wks, tks....lb.	....	.035	....	.035	.0275	.035
Nickel Salt, bbls, NY....lb.	.14	.14½	.14	.14½	.13	.14½
Nitre Cake, blk....ton	....	16.00	....	16.00	....	16.00
Nitrobenzene, drs, wks....lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls....lb.	....	.70	....	.70	....	.70
Orthochlorophenol, drs....lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms.lb.	.07½	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks....lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, drms.lb.	.08	.09	.08	.09	....	.09
Paraldehyde, 98%, wks lcl...lb.	....	.13	....	.13	....	.12
Chlorophenol, drs....lb.	.24	.27	.24	.27	.24	.27
Dichlorobenzene, wks....lb.	.12½	.14	.12½	.14	.11	.17
Formaldehyde, drs, wks...lb.	....	.22	....	.22	.21	.22
Nitroaniline, wks, kgs....lb.	.41	.43	.41	.43	.41	.45
Nitrochlorobenzene, wks..lb.	....	.18	....	.18	....	.18
Toluenesulfonamide, bbls..lb.	....	.70	....	.70	....	.70
Toluidine, bbls, wks....lb.	....	.44	....	.44	....	.48
Penicillin, ampules per 100,000 units....lb.	....	.38	....	.38	.38	.95
Pentaerythritol, tech....lb.	.27	.31	.27	.31	.27	.31

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast....gal.	....	.12½	....	.12½	.11½	.12½
Naphtha, East tks, wks....gal.	....	.11	....	.11	.11	.12
Rubber solvents, East, tks, wks....gal.	....	.12	....	.12	.11	.12
Stoddard Solvents, East, tks, wks....gal.	....	.12	....	.12	.10	.12

Phenol, U.S.P., drs....lb.	.11¼	.13¼	.11¼	.13¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks....lb.	.14½	.15½	.14½	.15½	.13	.15½
Potash, Caustics, 88-92%, wks, sol....lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
Flake, 88-92%....lb.	.07½	.08	.07	.08	.07	.07½
liquid, 45% basis, tks...lb.	....	.03½	....	.02⅞	....	.02⅞
dms, wks....lb.	.03¼	.04	.03¼	.04	.03	.03½
Carbonate, hydrated 83-85%, bbls....lb.	....	.05¾	....	.05¾	....	.05½
Chlorate crys, kgs, wks....lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs.lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks....lb.	....	.55	....	.55	....	.55
Iodide, dms....lb.	....	1.75	1.44	1.75	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton....ton	....	.53½	....	.53½	.53½	.56½
Permanganate, USP, wks dms....lb.	.22½	.23	.20½	.23	.20½	.21
Sulfate, 90%, basis, bgs....ton	36.25	39.25	36.25	39.25	36.25	39.25
Propane, group 3, tks....gal.	....	.03¾	....	.03¾	....	.03¾
Pyridine, ref., drms....lb.	.55	.55½	.55	.55½	.45	.55½
R Salt, 250 lb. bbls, wks....lb.	....	.65	....	.65	....	.65
Resorcinol, tech, drms, wks..lb.	....	.68	.64	.74	.64	.74
Rochelle Salt, cryst....lb.	.34½	.35	.34½	.35	.34½	.47
Salt Cake, dom, blk wks....ton	....	15.00	....	15.00	....	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided into 4 zones, prices varying by zone. Spot price is ½c higher.

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1 Horix corking unit, model CA38.
1 Sharples centrifuge, No. 6, with 3 HP, explosion-proof motor.
2 De Laval clarifiers, No. 166.

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1 Vertical, 4' x 7'6", forge welded steel, 900 lbs. pressure.
1 Vertical, 42" x 24'4", forge welded steel, 600 lbs. pressure.
1 42" x 48", jacketed, 150 lbs. internal, 500 lbs. pressure with agitator.
2 Jacketed autoclaves, 3' x 12', ⅝" shell, 100 psi.

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2 Charlotte, No. 3, stainless and monel, 3 HP motors.
2 Eppenbach, stainless, model "B", vertical, 1½ HP, AC motor.
1 Eppenbach, stainless, model "C", vertical, 5 HP, 3 phase motor.
2 New, stainless Chemi-Colloid, 30 HP and 50 HP motors.
1 Premier type "C", 5" rotor-stator, 3 HP motor.
1 Union Viscollizer, brass, No. 450 with 10 HP, AC motor.
2 U. S. horizontal, each two motors, 3 HP and 15 HP.

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5 Aluminum condensers, tubular type, 24" x 60".
2 Beth'ehem tubular condensers, 8463 sq. ft., 8' x 15', having 4500 tubes, ⅝" OD.
1 Devine tubular vacuum, cast iron, surface condenser, 8" x 57" with receiver, 18" x 28".
4 Schutte-Koerting, multi-jet, barometric condensers, varying capacities.
1 Stokes tubular vacuum cast iron, surface condenser, 12" x 5' with 60 gallon receiver.

DRYERS
1 Apron type single pass conveyor dryers, 18" x 23', motorized.
2 Double drum dryers, Black and Clawson, 30" x 60" with accessories.
1 Buffalo double drum, 30" x 90", complete with accessories.
2 Devine vacuum shelf dryers, 60" x 160", double door, 20 shelves.
1 Devine vacuum shelf dryer, 42" x 42", with 17 shelves.
1 Christie dryer, 70" x 40' long.
1 Fulton engineering rotary dryer, 3' x 24".
1 Proctor and Schwartz, steam heated, tray dryer, capacity—80 trays, 10" x 15" comp'ete with accessories.
1 Huhn rotary steam dryer, 3' x 13', continuous operation.
7 Rotary dryers, from 3' x 30' to 6' x 64'.
2 Single drum dryers, or flakers, 4' x 9' and 4' x 12' with accessories.
1 Albright flaking roll or drum dryer, 3' x 6' with accessories.

EVAPORATORS
1 Blaw Knox triple effect evaporator, horizontal type, 6' x 9', all steel.
3 Buffalo triple effect evaporators, 600 to 1200 sq. ft.
1 10' copper vacuum pan, calandria type.
1 Swenson single effect cast aluminum.
1 Zaremba cast iron single effect, 10' diameter x 12' high, 200 gallon holding capacity, copper tubes, complete with vacuum pump and condenser.

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1 Allen 10" extruder-strainer.

FILLERS
1 Ertel, 12 spout, stainless, vacuum filler, ⅜" spouts.
1 Kiefer, piston type Visco filler.
3 M & S, 6 piston fillers.
1 Triangle Elec-Tri-Pak, model N2C.
10 Pneumatic Scale tea bag fillers and sewers.
1 Stokes tube filler, 79 80A, closer crimper.
Buffalo and Vol-U-Meter can fillers.
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4 Cast iron, 30", recessed presses.
1 Filter press, cast iron, plate and frame, 60" x 48", having 40 plates and frames, open delivery.
1 Shriver, 12" square plate and frame, 8 chamber, aluminum, 2 eye corner feed, closed delivery.
1 Shriver, 36", rubber covered, 4 eyed closed delivery, 30 chamber.
15 Sperry, 32", recessed presses.

KETTLES
1 Full jacketed, 4' x 3', agitated, 200 gallon.
1 Lehigh, cast iron, coil heated, 2400 gallon, 6'9" x 9', with agitator.
2 Steel jacketed and agitated, 600 gallon.
Copper, Steel, stainless, jacketed; some agitated.
New stainless kettles, all sizes, prompt shipments.

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4 Burt, Standard-Kapp or Kyler all around labelers for cans, glass, etc.
1 Duplex New Jersey Labelrite.
2 Straight line fully automatic labelers; Pneumatic and Weeks-MacDonald.
8 World and Ermold semi-automatic labelers for spot labeling.

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25 Fitzpatrick, stainless, model "D", comminuting machines.
8 Raymond mills, Nos. "00", "0000", 45, 1, others.
2 Jay Bee No. 12 mills.
1 Lehman, 5 roll finisher or roller mill, 18" x 48".
1 Mikro pulverizer, No. 2.
2 Fuller mills, No. 33, 600 HP motor.
6 Stedman, Gruendler, Williams hammermills.
12 Ointment, drugs, paste and color mills; Day, Hance, Ross, Watervilie, etc.
2 Allis Chalmers tube mills, 5' x 22'.
3 Stearns Rogers tube mills, 5' x 22'.
2 Rod mills, 5' x 10', 6' x 14'.
4 Hardinge mills, 2' x 4'6", 3' x 3'6", 5' x 22", others.
1 Porter jacketed mill, 5' x 5".
1 Patterson, 5' x 5', lined pebble mill.
3 Jar mills, single jar, 16½ x 20; multiple, 3 (2 gallon).

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Prompt shipment all sized ribbon type, horizontal, all steel mixers.
1 Simpson Intensive mixer, 18" diameter, with double muller.
1 Day 30 gallon, stainless, Imperial mixer.
1 Day, 20 gallon, Cincinnatus vacuum mixer.
2 Patterson horizontal double ribbon, 30" x 40" x 84".
2 Heavy duty, jacketed, 9 gallon, double arm, double gear.
1 W & P, 100 gallon, double sigma arm, double geared.

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1 Complete packaging set-up consisting of:
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Hoepner-automatic, scale weigher, filler, bagger and stitcher for 5 and 10 lb. free flowing materials.
Fillers for liquids, paste, powders.
Labelers for all types of containers.
Envelope and bag sealers.
Wrappers, cartoners, conveying lines.

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2 Dunning & Boschert, 1200 ton, curb presses, 28" ram, 28" stroke, steam platen.
3 Elmes hydraulic presses; 10" x 14", with pump and accumulator.
Elmes compression molding presses; 35 ton to 200 ton, 22 x 30 to 30 x 73.
1 Farrel, 130 ton, heated platen, 20" x 20" and 1-150 ton, 26" x 26".
2 Hardinge hydraulic presses, 24" x 28" platens, 14" ram, 9" stroke.
1 Rennebura, 5 ton screw press and dryer, 50 HP motor.
2 Southwark hydraulic presses, 80 ton, 20 x 20, and 100 ton, 36 x 36, with heated platen and accumulator.
1 Stokes, 200 ton, semi-automatic compression molding press.
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1—Buffalo Vacuum Drum Dryer, 5'10" x 10'
2—Louisville Steam Tube Dryers, 6' x 50'
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2—Abbe Continuous Tube Mills, 4½" x 15'
1—Hardinge Conical Ball Mill, 8' x 30", Silex lined
4—Sweeland Filter Presses, #7, #10 & #12

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11—Sharples No. 5A Centrifuges, Stainless Steel Bowls
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1—Chrystie 80"x45' Rotary Dryer
3—Oliver Rotary Vacuum Filters 8'x10' and 5'x6', complete
1—Stokes #149B Vertical High Vacuum Pump
2—Dorr 15' Bowl Classifiers
1—Hardinge 3'x8" Conical Ball Mill
20—New Portable Electrical Agitators ¼ to 2 HP, 1750 to 288 RPM
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25—Aluminum, Copper and Steel Kettles, 20 to 1500 gals.
20—New Stainless Steel Tanks, 100 to 3000 gals.

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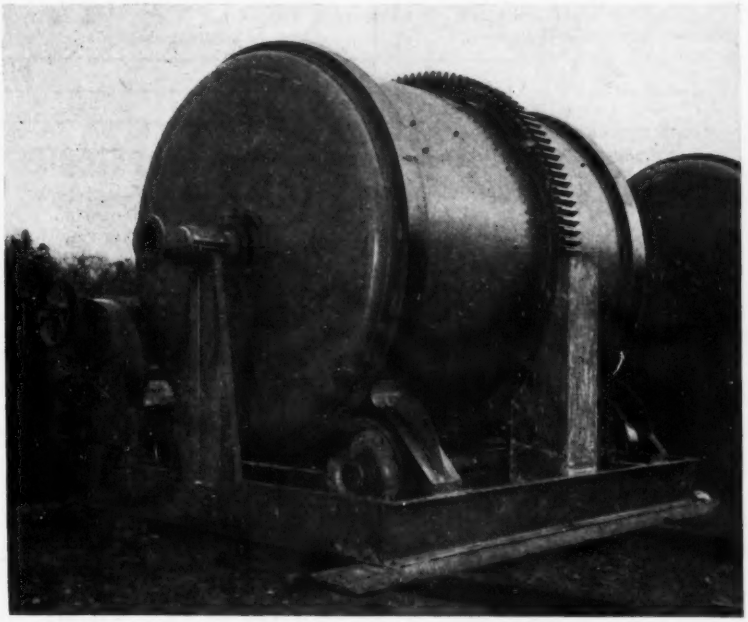

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One 6" x 4⅛" x 2" x 6" three stage Norwalk Compressor with intercoolers suitable for gas compression from atmospheric to 2000# pressure. Will demonstrate. Delaney Oil Company, Ada, Oklahoma.

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343 KW 3/60/2300 F. M. Diesel
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5' x 33' Steam Jacketed Vacuum Dryer
8—3 x 4 and 4 x 7 Hummer Screens
3 x 30, 3½ x 24, 5½ x 60, 6 x 40 and 6 x 59 Direct Heat Dryers
18 x 36 and 42 x 10 Acme Jaw Crushers
20 H.P. Charlotte 1½ in. Colloid Mill
1 yd. P. & H. 50' Boom Cart, Crane

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14—10,000, 15,000, 20,000 and 26,000-gal. Cap. Horizontal and Vertical
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Electric—540, 676, 1,000 and 1,578 ft.
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60 East 42nd St. New York, N. Y.

AVAILABLE

10—(New) 250 gal. closed Aluminum Tanks.
10—(New) St. St. Kettles: 60, 100, 200 gal.
20—(New) 2" Powell St. Steel Angle Valves.
10—Portable Electric Motors: ¼, ½, 1 hp.
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1—U. S. 10-spout hard rubber liquid filler.
1—No. 10 Day Imperial Mixer.
2—Packomatic Fillers and Env. Sealers.
1—Austin-Western #3 Gyratory Crusher.
2—20" S.W. Attrition Mills, 15 hp.
1—Elmes 3-piston Hydraulic Pump.
1—Revolvator elec. Hoist, 800#, 16' lift.
1—1800 gal. agitated Steel Mash Tub.
4—Water Stills: 10 and 25 GPH.
—Tolhurst 40" laundry Centrifugal.
7—25 cu. ft. jack Powder Mixers.

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P. O. BOX 281 LYNCHBURG, VIRGINIA

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1—Buflovak Shelf Dryer, 60" x 80"
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25—Stokes & Kux Rotary and Single Punch Tablet Machines, ½" to 4" dia.
2—Patterson Pebble Mills, 3' x 3', 6' x 5'
7—Baker Perkins and Readco 100 gal. Heavy Duty Jacketed Double Arm Mixers
12—Stainless Steel Kettles, 60 to 300 gal.
9—Rotex Sifters, 20" x 48" to 40" x 84"
8—1000 and 2000 lb. Powder Mixers, NEW
1—A. T. & M, 40" Centrifugal, 1200 RPM
3—Rotary Vacuum Dryers, 1½' x 3½', 30" x 8'
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The Closed Shop

(*Continued from page 248*)

The Wisconsin Supreme Court has thus attempted to do what as yet the United States Supreme Court has not—that is, to interpret the N. L. R. A. reference to closed-shop agreements in the light of what was in the minds of the legislators who enacted the law. This interpretation is considerably different from those made for the past 10 years by the N. L. R. B. The Wisconsin decision, however, raises the question of conflict between state and federal laws, which eventually will have to be settled either through a revision of the Act by Congress, or a decision of the U. S. Supreme Court.

At the November elections (1946) North Dakota adopted by referendum an amendment to its Constitutional Bill of Rights reading: "The right of persons to work shall not be denied or abridged on account of membership or non-membership in any labor union or labor organization." At the same time Nebraska and Arizona adopted similar constitutional amendments. If the U. S. Supreme Court rules that these conflict with the N. L. R. A., probably the present Congress will clarify the issue, as it should do in any event.

INSECT CONTROL

(*Continued from page 240*)

mula and methods employed in Tests 2, 3 and 4 will give an aerosol that is effective for a longer time than with 0.03 or 0.04 inch capillaries. This is in line with the work reported by McGovran et al[5]. The retention of DDT in the air is much greater when a smaller capillary is used.

With the apparatus described here the aerosol had an upward velocity of 250 feet per minute at a distance 40 feet above the floor. The efficiency might possibly be improved in the light of investigations by Latta et al[7] on particle size and speed of motion of DDT aerosols.

In order to study the natural mosquito population both inside and outside the factory building, and to determine the overall effectiveness of dispersing the aerosol, mosquito traps were designed and built similar to the New Jersey apparatus[8] except that they were larger and handled greater volumes of air. Counts were made regularly inside and outside the building at carefully selected locations.

RESULTS DURING ROUTINE OPERATION

During the summer of 1945 this aerosol dispersing equipment was used approximately once each week during the entire mosquito season. It was run in the same manner as during Test #4, using 0.015 inch diameter capillaries and a dose of approximately 60 pounds of aerosol for each run. By calculating the average number of mosquitoes per week per trap inside and outside the building, it was found that the average for the inside of the building was 32 mosquitoes per week per trap, while outside the building the average was 272.

The reaction of employees was even more favorable than would be estimated from the mosquito counts. They felt that the dispersion of the aerosol in the building had very markedly improved working conditions, and that the mosquitoes in the plant were no longer a serious problem. The observation of the reduction in the actual number of mosquitoes inside the building, as well as the extremely favorable employee reaction, have indicated that this method of mosquito control has proven satisfactory. From our observations it would appear that freedom from the mosquito nuisance is obtained by maintaining a low population of mosquitoes in the plant at all times and that it is not necessary to attempt to maintain the mosquito population at zero. From the standpoint of control, the most important times occur when there is a large increase in the numbers of mosquitoes outside the plant. These periods of high mosquito population usually occur about 10 days after heavy rains, particularly when the temperature is relatively high. Actual operation of the equipment during one entire season has indicated that the apparatus and methods of distribution of the aerosol are practical and economical.

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Plastic Makers Elect Officers

John R. Hoover of Cleveland, Ohio, vice president of B. F. Goodrich Chemical Co., and D. S. Frederick of Philadelphia, Pa., vice president of Rohm & Haas Company, have been elected president and vice president, respectively, by the Plastic Materials Manufacturers Association, Inc. F. H. Carman was re-elected general manager and John E. Walker, secretary-treasurer of the association, with headquarters in Washington.

The association named a seven-man board of directors, which will include Mr. Hoover and Dr. Frederick, three directors continued from the 1946 board, M. G. Milliken of Wilmington, Del., vice president of Hercules Powder Company; Felix N. Williams of Springfield, Mass., vice president of Monsanto Chemical Co., and Harry Krehbiel of New York, president of Catalin Corporation of America. New members of the board are C. J. Romieux of New York, sales manager, Plastics Division, American Cyanamid Company, and W. Stuart Landes of New York, vice president of Celanese Corporation of America and retiring president of the association.

Commercial Introduction Of Aralen Tablets

Commercial introduction of Aralen, a new antimalarial, in tablet form is announced by Winthrop Chemical Company, Inc. This is the brand of chloroquine first known as SN7618, the laboratory number given it when it was under investigation by the National Research Council.

For the drug trade and medical profession, Aralen is being packed in tubes and bottles. Aralen was synthesized by Winthrop on March 1, 1944.

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INDEX *of* ADVERTISERS

"WE"— EDITORIALLY SPEAKING

READERS WHO HAVE followed this page during the past year realize that we have a mouse fixation: the reactions of our little furry friends to all sorts of scientifically controlled stimuli and environments hold a pathological fascination for us. The latest news from the mouse front is that the dull, insipidly colored mice are gobbled by owls 24 to 29 per cent less than their gaudier, contrasting-with-the-earth brethren. Perhaps we males could take that lesson to heart and assume a protective coloration when the bill collectors come around.

GIVAUDAN-DELAWANNA, INC., has carried things to a very fine point and made a survey of surveys. In *The Givaudanian* they point out that 82 per cent of the single women surveyed received perfume as a gift sometime during the year, while only 64 per cent of the married women were so remembered. "We find in these figures," the magazine says, "that the American husband is evidently more generous during the courtship days than he is after the marriage."

Come on, fellows, let's stop in at the five-and-ten on the way home and buy the little woman some toilet water!

A THOUGHT for the month is set forth in the British publication, *Chemistry & Industry:*

"The chemical industry owes its existence and prosperity to chemical science, but what about the debt that chemical science owes to the chemical industry? In this country, in America, in Sweden, and in several other countries the chemical industry has not been unmindful of chemical science. Princely donations have been made for research in universities, for the endowment of professorships, for new buildings, for expensive equipment, and many other purposes. It would be an interesting and a grateful task to collect a list of the gifts of capital and interest made by companies and individuals for the benefit of chemical science."

WE HAVE BEEN TRYING to make something out of the new Soviet genetics as reported in *Nature,* but we're not getting very far. This Lysenko character, founder of the new school, has apparently "condemned the work of Mendel, Bateson and Morgan as clerical, bourgeois-capitalistic and fascist, . . . disdained the use of statistics, controls, and such-like experimental techniques . . ." etc.

We have always naively believed that Democratic chemistry was exactly the same as Republican chemistry, that capitalistic astronomy differed little, if at all, from fascist or communist astronomy.

It appears that we're wrong. Apparently all one has to do to be an outstanding scientist is to close up the laboratory and memorize the party line.

HAVING DONE RESEARCH in our day, we heartily agree with the statement of C. F. Burgess in accepting the Perkin Medal back in 1932. He said, "The greatest pleasure to be derived from research is that which comes to the worker when freed from all thoughts of cost or of the economic value of the results."

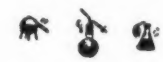
Let's paste *that* in the research director's hat!

WE DEPLORE THE FACT that our American legislators are evidently less receptive to the Muse than their British counterparts. Sir Alan P. Herbert, M. P., toasted the Paint Federation at its Annual Dinner with verse:

"It must be fun to manufacture paint.
Who else does nothing but distribute charm,
Gives so much pleasure, does so little harm?
(You're not responsible, I think, for those
Who paint their faces and—my hat—their toes.)"

E. D. FUNK, JR., of F S & W Cob Products Co., revives memories of Chic Sales in writing of the industrial status of the corncob in the publication, *Corn*: "An old and familiar use, out behind the house, still persists in some quarters where the cob is considered superior to mail order catalogs and feed advertising circulars."

Still two baskets—a larger one of red and a smaller one of white?



RUMOR HAS IT (*Hold on, we're being facetious!*) that large quantities of carbide are going into exploding scarecrows. Our operatives have learned that a New York farmer has one to discourage birds who eat his corn. It ignites carbide gas every three minutes with a blast sufficient to scare hell out of the birds within a ten-acre radius.

FIFTEEN YEARS AGO

(From our Files of February, 1932)

Theodore Swann steps into the fertilizer picture with a new concentrate. There is speculation that the Swann interests may make a bid for Muscle Shoals.

The House Committee on Military Affairs is still in session concerning Muscle Shoals. It has been learned that neither Ford nor Cyanamid is interested in making a bid. Chairman Hobbs, of the State-Federal Muscle Shoals Committee, declares that no private producer would be interested in a lease with the present restrictions. It is rumored that the bill reported out of committee will favor private ownership.

Charles H. Herty, authority on the naval stores and pulp industry, is awarded the American Institute of Chemists Medal for 1932.

At Wilmington, N. C., experiments are under way by Dow Chemical Co. for extraction of bromine from sea water, looking to the erection of a plant to cost perhaps $2,000,000.

Magnesium Development Co. is formed by Alcoa and I. G. Farben.

THIRTY YEARS AGO

(From our Files of February, 1917)

Merck & Co. will prosecute, if it can find them, the swindlers who sold precipitated chalf in boxes with forged Bismuth Subnitrate Merck labels. Not content to substitute chalk and forge the labels, the swindlers also gave short weight in the 5-lb. boxes.

Although Bayer's aspirin patent expires this month, the Bayer Company plans to defend its rights to "Aspirin" as its trade-mark.

The Muscle Shoals Association has prepared a book for President Wilson, the burden of which is that Muscle Shoals, on the Tennessee River, is the best location for the Government's proposed $20,000,000 nitric acid plant.

Dow Chemical Co. starts manufacture of synthetic indigo.

The American Institute of Weights and Measures has been formed to fight the metric system.

If this country enters the war, Eli Lilly & Co. will give $25,000 to the American Red Cross for a base hospital.

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2. Elimination of conventional ground coat.
3. Elimination of copper heading.
4. Improved sag resistance.
5. Improved resistance to warping.
6. Excellent deep drawing qualities.
7. Use of conventional cover coats directly on metal.
8. Resistance to hydrogen penetration or absorption.

The benefits you derive from these advantages are: Lighter enamel weights and coats... reduction of chippage and mechanical breakage losses... increase in production efficiency through reduction of rework and re-operation... sharply improved thermal shock resistance of white enamel, due to thinner enamel thickness... overall cost reduction for enameled ware... increase in production speed. Even when a ground coat is used this NEW Titanium Steel for Vitreous Enameling brings important manufacturing cost reductions.

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Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 25 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 591, Nos. 4, 5—Vol. 592, Nos. 1, 2 (October 22—November 12)—p. 753

**Equipment*

Thermostat comprising temperature-responsive element, first switch opened by temperature-responsive element in response to increase above predetermined temperature and closed thereby upon decrease below substantially the temperature, etc. No. 2,409,420. Earl Clark to Westinghouse Electric Corp.

Flow indicator for pipe lines. No. 2,409,430. Carroll Greenleaf.

Apparatus for throttling flow of air through intake end of duct. No. 2,409,433. Willson Hunter to The B. F. Goodrich Co.

In apparatus for measuring radioactivity in deep narrow borehole, long narrow element sensitive to radioactivity, means to indicate radioactive intensity of rays impinging on element, filter serving to absorb portion of rays impinging upon element sensitive to radioactivity. No. 2,409,436. Shelley Krasnow and Leon Curtiss to Geophysical Development Corp.

Method and apparatus for cleaning furnace checkers and flues. No. 2,409,442. William Montgomery.

Air preheater for furnaces and the like. No. 2,409,451. Marek Steuerman.

Radiant energy locating system. No. 2,409,456. William Tolson and Carl Meneley to Radio Corp. of America.

In liquid fuel burner, mixing and combustion chamber element, having air inlet means, means for delivering liquid fuel to interior of chamber element, liquid fuel receiving cup, located in interior of chamber element and in line of delivery of liquid fuel to interior of chamber element, means for varying flow of liquid fuel to interior of chamber element in response to changes in volume of liquid fuel in cup. No. 2,409,470. James Breese to Oil Devices.

Apparatus for supplying air and oil to burner, comprising, positively-acting displacement pump for supplying air, inlet and discharge conduits for pump including in discharge conduit, chamber, wall in chamber movable by pressure of pumped air, pump for supplying oil, etc. No. 2,409,477. Warren De Lancey to Gilbert & Barker Mfg. Co.

Grinding and polishing booth comprising upright casing having sump in bottom for body of water, upstanding open top air inlet chamber in front portion and above and communicating with sump, an upstanding open top air outlet chamber in back portion and above and communicating with sump, embodying work supporting grill across open top of air inlet, etc. No. 2,409,479. Ernest Fisher to Whiting Corp.

Receptable having entrance opening, watertight closure for opening comprising flexible strips having elastic properties and tongue on one and groove in other for interlocking engagement one with other, removable spanner clamp for holding strips in interlocked relation, etc. No. 2,409,489. Victor Hurt to United States Rubber Co.

Thermal time sequencing control system. No. 2,409,492. Benjamin Jones to General Electric Co.

Geiger-Muller counter tube filled with vapor comprising organo-metallic compound consisting of alkyl compound of non-radio-active metal of series 9 of period system and having atomic weight of at least 200. No. 2,409,498. Albert Keston.

Combination in oil burner, having nozzle, pump to supply oil to nozzle, cut-off valve for preventing flow of oil to nozzle whenever pressure of pumped oil is less than predetermined value, etc. No. 2,409,504. Joseph Logan to Gilbert & Barker Mfg. Co.

Device for controlling, from remote point, movement of masses of material comprises support, arm swingably mounted support, carriage mounted on arm for movement along length of arm, material-engaging means depending from carriage, reversible positive propulsion means for driving carriage in both directions along length of arm, counterbalancing means cooperating with support for automatically raising arm when carriage is moved to position adjacent support. No. 2,409,513. William Patience and Donald Kimball, II to Darling & Co.

Valve body having bore therethrough enlarged at both ends, valve slidable in bore, means closing enlarged ends of bore, having stops projecting inward beyond enlarged portion of bore to limit movement of valve, etc. No. 2,409,517. Louis Schmit.

Kiln comprising vertical shaft having pre-heating zone and calcining zone, crosspipe within shaft located near top of calcining zone, having inlet means for hot gas from calcining zone, means connected with pipe for recirculating gas to point at lower end of calcining zone, second pipe across interior of shaft located near top of pre-heating zone, having inlets for receiving cooler gas from pre-heating zone, etc. No. 2,409,527. Victor Azbe.

Buoyant electric cable, combination of plurality of hermetically sealed, plastic center members or cells, braced internally, with transversely extending wooden discs, spacers between adjacent cylinders, conductor stranded about cells and spacers, and enclosing, non-metallic, water-impervious, flexible sheath, weight to volume ratio of cable such as to enable same to float in sea water. No. 2,409,529. Harry Beede to The Okonite-Callender Cable Co., Inc.

Electric cable comprising paper insulated conductor, bare conductor, enclosing polyethylene tetrasulfide sheath, and armor of paper impregnated with terpin hydrate. No. 2,409,530. Charles Bennett to The Okonite Co.

Tubular filling spout projecting outwardly from tank. No. 2,409,532. Robert Bentley and Howard Bentley.

Marking surface of insulation of insulated wire and cable and vulcanizing same in continuous operation. No. 2,409,539. Grover Brown to The Okonite Co.

Electrode for spot welding. No. 2,409,550. Matthew Dobkowski.

Flaw detector for tubing. No. 2,409,554. Harcourt Drake to Sperry Products, Inc.

Automatic control valve for jet pumps. No. 2,409,561. Thaddeus S. Harris.

Air cleaning plant. No. 2,409,563. Carl Hedberg to Research Corp.

Supernatant selector device for sludge digestion tanks. No. 2,409,585. William Piatt to Pacific Flush Tank Co.

* *Continued from Vol. 590, Nos. 3, 4, Vol. 591, Nos. 1, 2, 3.*

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

December 24, 1946

Pat. 2,050,118. Method of Treating Wood Surfaces for Photographic Reproduction Thereof. Patented Aug. 4, 1936. Groups 28—12; 28—89. Reg. No. 4,415.

Pat. 1,723,154. Electrolytic Cell and Solution Therefor. Patenteded Aug. 6, 1929. Group 36—91. Reg. No. 4,676.

Pat. 1,723,155. Solution for Electrolytic Cells. Patented Aug. 6, 1929. Group 36—91. Reg. No. 4,677.

Pat. 1,781,641. Electrolytic Cell. Patented Nov. 11, 1930. Group 36—91. Reg. No. 4,678.

Pat. 1,845,047. Electrolytic Cell and Mounting Therefor. Patented Feb. 16, 1932. Group 36—91. Reg. No. 4,679.

Pat. 2,010,758. Electrolytic Condenser Insulation. Patented Aug. 6, 1935. Group 36—91. Reg. No. 4,680.

January 7, 1947

Pat. 2,403,999. Sonic Method for Testing Metal. Patented July 16, 1946. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) By use of the apparatus disclosed in this patent, non-magnetic metal objects, such as cartridge cases, may be tested to detect flaws or cracks prior to resizing or reconditioning. This is accomplished by exciting the object to longitudinal vibration at its natural or resonant frequency. By building the amplitude of the resonant vibration up to peak stress, an exceedingly high intensity is induced. By measuring the damping capacity (internal friction) at this high amplitude and comparing it with known standards, the object may be classified as either sound or defective. (Owners) Thomas A. Read, Herbert I. Fusfeld, and Sumner W. Kitchen. Address correspondence to Thomas A. Read, 112 Seminole Ave., Philadelphia 11, Pa. Group 36—62. Reg. No. 4,979.

January 14, 1947

Pat. 1,919,289. **Method and Machine for Use in Paper-Making Industry.** Patented July 25, 1933. This invention relates to a method and means to prevent the dehydration of wood fiber or similar stock so that it may be maintained in a fluid or semi-fluid condition. This is accomplished by trapping a portion of stock in the pipe-line between a stock and beater tank. Since the material remains in substantially liquid condition, circulation is effected by intermittent instead of constant operation. (Owner) William E. Beach, Riverside, Ill. Group 35—54. Reg. No. 5,004.

Manufacturing cathode ray tube having envelope and target foundation comprising evacuating envelope to pressure corresponding at least to 10^{-6} mm. Hg, bombarding foundation with cathode rays, vaporizing alkali metal halide within evacuated envelope, condensing alkali halide on foundation during cathode ray bombardment thereof. No. 2,409,606. Humboldt Leverenz to Radio Corp. of America.

**Explosives*

Composition of matter comprising pentaerythritol tetranitrate, trinitrotoluene and dipentaerythritol hexanitrate. No. 2,407,805. Joseph Wyler to Trojan Powder Co.

Treatment of single base smokeless powders comprises tumbling base grain powder with alcoholic solution of solid deterrent which has good solubility in alcohol and has weak gelatinizing power selected from pentaerythritol tetra-acetate and phthalide. No. 2,407,967. Thomas Thomson to Imperial Chemical Industries Ltd.

Free-flowing diazodinitrophenol in form of tabular crystals containing absorbed triphenylmethane dye. No. 2,408,059. Frederick Garfield and Herman Dreher to Olin Industries, Inc.

Electric igniter of blasting detonator in combination with means by which it is safeguarded against accidental firing by electric shock or spark discharges produced in, or in vicinity of, firing means of igniter by atmospheric electricity, comprising coherer mass in electrical cooperation with insulated conductive branches connected with each lead of igniter, branches having bared parts surrounded by coherer mass, etc. No. 2,408,124. Hans Rolfes.

Means for safeguarding firing means of blasting detonators against static charges, including safeguarding material of nature to provide high resistance against current voltages for intentional firing and low resistance to higher voltages of static charge, etc. No. 2,408,125. Hans Rolfes.

Rigid blasting cartridge comprising cylindrical explosive charge of water-soluble material and rigid water-resistant tubular envelope, having water-resistant crimped end closures. No. 2,408,189. Arthur Baker to Hercules Powder Co.

Means for crimping blasting caps upon fuses. No. 2,409,549. Alexander Djidics to Atlas Powder Co.

*Food

Means for controlling discharge of finely divided material from receptacle comprising boot for receiving material from receptacle, feeder in boot, motor operating feeder, mercury tilt switch controlling current to motor, etc. No. 2,408,221. Jacob Michel to Bluhill Foods, Inc.

Process for making coffee extracts. No. 2,408,260. John Kellogg to John Kellogg & Co.

In preparing sweetening medium from fruit, comprise adding acidic material to composition obtained by grinding fruit material and comprising sweetening ingredients of fruit together with acids and ash-forming materials of fruit, etc. No. 2,408,418. Arvid Erickson and John Ryan to Barron-Gray Packing Co.

*Inorganic

In cell for recovery of metals by electrolysis of fused metal compounds, arrangement of electrodes comprising conductive plane bottom, conductive separately movable cathode bars disposed on and in contact with bottom to form trough-like spaces to collect deposited metal. No. 2,407,691. Robert Suchy and Georg Messner.

Making negative resistance-temperature coefficient resistance material comprising mixing finely divided titanium dioxide in molecular proportions with finely divided monoxide of metal selected from magnesium, zinc and cadmium, and combining oxides into true titanate by heating mixture to melting temperature. No. 2,407,750. Frederick Smith to Research Consultants Ltd.

Recovering hard metal carbides from scrap material comprising hard metal carbides and auxiliary metal of iron group, in which coarsely crushed scrap material is fused with zinc to form alloy of zinc with said auxiliary metal, alloy removed by a solvent. No. 2,407,752. Edward Trent to Powderloys Ltd.

Handling acidic oxygen products of sulfur comprising contacting oleum containing dissolved sulfur trioxide with gaseous sulfur dioxide under temperature and pressure conditions conducive to evaporation of sulfur trioxide from oleum to produce gaseous mixture of sulfur dioxide and trioxide, in separate region contacting gaseous mixture with liquid absorbent for sulfur trioide. No. 2,407,822. Frank Fahnestock and William Hagerbaumer to Socony-Vacuum Oil Co. Inc.

Producing metal powder comprises heat treating low silicon, chromium-containing ferrous alloy in solid phase at temperature to effect intergranular carbide precipitation disintegrating heat treated material and separating granular from intergranular material. No. 2,407,862. John Wulff.

Preparation of boric oxide catalysts comprises continuously feeding to boiler aqueous solution of boric acid, continuously generating in boiler and withdrawing steam-boric acid vapor mixture, passing superheated and expanded mixture through bed of adsorptive base material consisting predominantly of alumina, etc. No. 2,407,914. William Bailey, Jr. and James Burgin to Shell Development Co.

Forming rugged pervious mass of formed catalyst particles consisting of mixture of aluminum chloride and calcium chloride, comprises heating mixture of solid particles of aluminum chloride and calcium chloride, containing at least 20% by volume interparticle voids, to 300° to 325° F. No. 2,408,164. Arch Foster to Phillips Petroleum Co.

Treating activable, non-swelling clay containing montmorillonite to improve adsorptive characteristics comprises converting non-swelling clay into swelling clay by suspending clay in dilute aqueous medium having pH of at least 8.5 containing small amount of dispersing agent furnishing alkali metal ions, etc. No. 2,408,207. Allen Garrison and Karl ten Brink to Texaco Development Corp.

Production of catalysts comprising major proportion of silica gel and minor proportion alumina gel in ring form. No. 2,408,215. George Keating to The Texas Co.

Producing stabilized sodium acid pyrophosphate comprises drying monosodium orthophosphate solution less than 12 seconds upon drum dryer heated by saturated steam under at least 110 lbs. to produce dry NaH_2PO_4, converting NaH_2PO_4 into sodium acid pyrophosphate by passing it through rotary kiln countercurrent to stream of air having entering temperature of 240° C. to 250° C. and containing water vapor at partial pressure of 100 to 140 mm. of mercury. No. 2,408,258. Eugene Hetzel and George Taylor to Monsanto Chemical Co.

Process of metal recovery in which gas-vapor mixture containing carbon monoxide and vapor of metal miscible with molten aluminum is contacted with molten aluminum body and vapor of miscible metal absorbed in body, improvement consisting in providing aluminum body with content of beryllium and manganese. No. 2,408,278. Philip Stroup and Charles Willmore to Aluminum Co. of America.

Obtaining precipitated nickel compounds free of sulphur impurities from ammonium carbonate leach liquors containing nickel compounds dissolved therein and sulphur impurities, substantial amount of sulphur of which unites with nickel in water-insoluble form on expelling ammonia from solution, steps which comprise adding to product leach liquor soluble alkali metal compound, heating resulting mixture until nickel content is precipitated. No. 2,408,311. Robert Hills and Maurice Dufour to Nicaro Nickel Co.

Abrasive article comprising abrasive grains, bond uniting grains as integral body, combination of iron sulphide and potassium fluoborate interspersed throughout bonded mass. No. 2,408,319. Samuel Kistler to Norton Co.

Hydrated dolomitic lime whose magnesium oxide content is slaked to 35%, mixed with 1% or less of agent capable of preventing thickening of putty made of lime, on gauging with gypsum. No. 2,408,324. Chauncey Loomis and William Barrett to New England Lime Co.

Activation of platinum-containing catalysts suitable for oxidation of sulphur dioxide to sulphur trioxide comprising treating catalyst at temperature not exceeding 20° C. with aqueous solution prepared by interaction of sulphur dioxide and metallic iron in presence of water. No. 2,408,396. George Horsley to Imperial Chemical Industries Ltd.

Improvement in conditioning easily oxidized metal for casting comprises transferring molten metal without contact with air from beneath surface of body of molten metal to elongated conduit, heating molten metal in conduit to temperature within a predetermined range above temperature of body of molten metal. No. 2,408,467. Ellis Lyons to Reconstruction Finance Corp.

Phosphor consisting of zinc oxide matrix with one per cent of bismuth in activating relation to matrix, whereby same is rendered excitable to fluorescence. No. 2,408,475. Clifford Nickle to General Electric Co.

Producing sulphamic acid from urea, sulphuric acid, and sulphur trioxide, steps comprising adding urea, sulphuric acid, and sulphur trioxide to solid particulate diluent. No. 2,408,492. Ernest Tauch to E. I. du Pont de Nemours & Co.

Depositing tin on iron surface consists in coating iron with powdered tin held in co-polymer of vinyl chloride and vinyl acetate vehicle then heating. No. 2,408,515. Arthur Hopkins.

Coating of steel structure with aluminum comprises pickling with acid medium to remove adhering oxide, washing pickled article in water, applying molten aluminum to surface containing only water. No. 2,408,623. Harvey Gilbert to E. I. du Pont de Nemours & Co.

Producing plastic hydrated lime comprises burning raw limestone in form of pieces of widely varying sizes under conditions to burn all of limestone pieces to condition of absence of unburnt core, also producing some overburnt lime, hydrating lime mixture under superatmospheric pressure to insure complete hydration, reducing free moisture content to below 1%. No. 2,408,647. Harry Huntzicker and Charles Norman, Jr. to United States Gypsum Co.

Preparation of silicic acid sol steps comprising mixing with agitation aqueous silicic acid sol which does not exhibit evidence of gelling and organic hydrogen bonding donor compound which contains at least one oxygen atom bonded to carbon atom, is selected from group of ethers in which carbon atoms attached to ether oxygen are not attached to each other, amides, and ketones, etc. No. 2,408,654. Joseph Kirk to E. I. du Pont de Nemours & Co.

Improving stability against jelling of polysilicic acid solution steps comprising mixing aqueous polysilicic acid solution and trialkyl ester of phosphoric acid in which alkyl group contains less than five carbon atoms, removing water from mixture. No. 2,408,655. Ralph Iler and Joseph Kirk to E. I. du Pont de Nemours & Co.

Producing liquid alcohol-polysilicic acid hydrogen-bonded complex having pH below 3.0, containing not more than 20 per cent by weight of water. No. 2,408,656. Joseph Kirk to E. I. du Pont de Nemours & Co.

Production of electrolytic copper cathodes involving electrolytic precipitation of copper from sulphuric-acid-containing electrolyte, improvement comprises inhibiting formation of sprouts on cathodes during electrolysis by adding to electrolyte oil-treated acid obtained by agitating one volume of naphthenic crude oil with five volumes of 78% to 95% sulphuric acid, causing oil-treated acid to settle and tar-like material to form on top, removing tar-like material, resulting oil-treated acid being added to electrolyte in amount corresponding to that produced by treatment of 1.4 to 2.8 gallons of crude oil per ton of copper cathodes precipitated. No. 2,408,668. William Mason to Inspiration Consolidated Copper Co.

Producing lithium hydride, improvement comprises confining charge of lithium oxide and silicon-bearing material in reaction zone, subjecting charge and reaction zone to vacuum to remove objectionable air and moisture, admitting inert gas to reaction zone sufficient to place it under substantial positive pressure, heating charge to reduce lithium oxide and distill resulting metallic lithium, etc. No. 2,408,748. Peter Alexander to Metal Hydrides Inc.

Anhydrous monofluorophosphoric acid being clear, oily liquid colorless and odorless, of density of 1.82 at 25° C., containing 31% P and 19% F. No. 2,408,784. Willy Lange and Ralph Livingston to Ozark Chemical Co.

Producing anhydrous monofluorophosphoric acid, mixing phosphorus pentoxide and hydrofluoric acid of any HF concentration between 69% and 100% according to equation described in patent. No. 2,408,785. Willy Lange to Ozark Chemical Co.

Manufacture of sulphamic acid steps of bringing together urea and liquid sulphur trioxide in proportions of 6 parts of liquid sulphur trioxide for each part of urea, effecting reaction under such conditions that there is no loss of sulphur trioxide from reaction vessel during reaction, introducing sulphuric acid in proportion of one mole of sulphuric acid for each mole of urea and heating. No. 2,408,823. Ernest Tauch to E. I. du Pont de Nemours & Co.

Regeneration of contaminated hydrogen fluoride catalyst containing accumulated organic material and water comprises heating catalyst under superatmospheric pressure to decompose organic fluorine compounds in catalyst, introducing heated catalyst into flash vaporization zone, removing hydrogen fluoride and water vapors overhead, withdrawing unvaporized organic material from bottom, introducing preheated isobutane vapors into bottom of zone to remove hydrogen fluoride from organic material. No. 2,408,933. John Iverson to Universal Oil Products Co.

Producing calcium-free beryllium sulfate includes steps of producing solution which at room temperature is saturated with beryllium sulfate and has also in solution calcium sulfate not to exceed 3 grams per liter of solution and ammonium sulfate not less than 80 grams per liter of solution and such that the ratio of ammonium sulfate to calcium sulfate is at least approximately 125 to 1, evaporating solution to point where substantial amount of beryllium sulfate is crystallized on cooling. No. 2,408,934. Bengt Kjellgren to The Brush Beryllium Co.

Preparing pheroidal inorganic oxide gel particles of improved characteristics comprises forming hydrosol of inorganic oxide including silica and metal oxide characterized by inherent capacity to set hydrogel upon lapse of suitable period of time without addition to or subtraction from said sol of any substance, etc. No. 2,408,986. Milton Marisic and Arthur Schmitt to Socony-Vacuum Oil Co. Inc.

Luminescent composition comprising as principal ingredient barium fluorhalide which has been heat-treated at 1450° and containing one quarter of one per cent by weight of silicon compound selected from silico fluorides, silicates and silicon dioxide. No. 2,409,174. Herbert Dietz to Eastman Kodak Co.

Desiccant consisting of native montmorillonite acid activatable sub-bentonite clay having a V.M. of 5.5 to 7%. No. 2,409,263. Frederick Ewing and Roger Lovett to Filtrol Corp.

Making molded basic magnesium carbonate compositions, steps of preparing slurry of magnesium compound selected from magnesium oxide and magnesium hydroxide in water, initial concentration of slurry such that there are from 9 to 14 parts by weight of water for each part by weight of magnesium compound based on its MgO content, introducing carbon dioxide gas while maintaining slurry at below 100° F. until magnesium compound is converted to self-setting crystals. No. 2,409,297. Alan McGarvey to Armstrong Cork Co.

Production of nitrogen gas at pressures in excess of 500 pounds per square inch from exhaust gases of internal combustion engine containing large proportion of nitrogen together with oxides of nitrogen and water vapor, improvement comprises treating gas in compressed state after last cooling stage and immediately prior to final compression stage with silica gel until water content is less than .01%, whereby cor-

* *Continued from Vol. 590, Nos. 3, 4, Vol. 591, Nos. 1, 2, 3.*

rosive effect of residual oxides of nitrogen in gas is inhibited. No. 2,409,386. Eric Pridonoff and Arthur Schneider to Aerojet Engineering Corp.

Producing purified sodium hydrosulfide comprises forming Na_2SNaHS liquor containing metallic impurities of type present in commercial sodium hydroxide, contacting liquor with H_2S gas containing CO_2 as impurity under temperature conditions high enough to maintain sodium sulfide in liquid phase, etc. No. 2,409,392. Arthur Saddington to The Solvay Process Co.

Recovering sulfur from free sulfur bearing ores comprising: crushing ore; placing crushed ore in wheeled cars having screened bottoms; forcing each succeeding car beneath spray of hot kerosene so that it will force proceeding car from beneath spray; collecting solution flowing from screened bottoms of cars; chilling collected solution to precipitate sulfur, etc. No. 2,409,408. George Tweeddale.

Oxidation-resistant cuprous oxide powder comprising cuprous oxide powder individual particles of which have surface coating of dextrin. No. 2,409,413. Harold Becker to Merck & Co. Inc.

Production of hydrocyanic acid by reacting, in refractory container, mixture containing nitric oxide and gaseous hydrocarbon together with water vapor, oxygen or nitrogen in presence of catalyst containing metal of platinum group. No. 2,409,429. Howard Green and Philip Hendrixson to E. I. du Pont de Nemours & Co.

Separating air into its constituents, oxygen and nitrogen, comprises compressing and cooling air at high pressure, liquefying portion of compressed and cooled air without prior reduction of pressure, reducing pressure of remainder of compressed and cooled air, subjecting air at reduced pressure to liquefaction and subsequent rectification to separate it into two fractions, etc. No. 2,409,458. Claude Van Nuys to Air Reduction Co. Inc.

Separating constituents of atmospheric air by liquefaction and rectification under conditions affording resistance to travel of air. No. 2,409,459. Claude Van Nuys to Air Reduction Co. Inc.

Production of dispersion of sodium in mixture of inert liquids to be used in chemical reaction comprises dispersing, with agitation, molten sodium in inert liquid having boiling point above melting point of sodium, cooling dispersion to below melting point of sodium while maintaining latter in dispersed condition and adding to dispersion second inert liquid having boiling point below melting point of sodium, second liquid added in amount to form mixture boiling below melting point of sodium. No. 2,409,519. Charles Tanner to Imperial Chemical Industries Ltd.

Dry hydrated lime comprising clusters of individual finely divided particles and having improved properties, including plasticity in excess of 200 available immediately upon mixture with water as distinguished from plasticity requiring hours of soaking to develop, etc. No. 2,409,546. Bolton Corson.

Manufacture of sulfamic acid, steps comprising bringing together as reactants urea and oleum of at least 45% and not more than 50% strength in proportions to supply one mole of sulfuric acid for each mole of urea to form liquid in main body of liquid which has been similarly formed from reactants in proportions by cooling to suppress formation of sulfamic acid, etc. No. 2,409,572. James Leonard to E. I. du Pont de Nemours & Co.

Luminescent phosphor consisting of thermally crystallized combination of sulphide and fluoride of metal selected from zinc and cadmium wherein fluoride is between 0.1% and 15% by weight based on weight of sulphide. No. 2,409,574. Humboldt Leverenz to Radio Corp. of America.

*Medicinal

Aqueous solution of riboflavin having concentration of riboflavin higher than in water alone, containing water-soluble alkali metal salt of gallic acid to increase solubility of riboflavin in aqueous solution. No. 2,407,624. John Bird and Andrew Kuna to The William S. Merrell Co.

Sulphanilamide derivatives and method of preparing. No. 2,407,686. Simon Ruskin to Frances Ruskin.

Production of erythroidine from seeds and dried flowers of Erythrina americana, comprising treating such plant parts with solvent which removes fatty oils, extracting treated material with alcohol, concentrating alcohol extract, dissolving residue in acidulated water, weakly alkalinizing resulting solution, extracting erythroidine with chloroform. No. 2,407,713. Randolph Major and Karl Folkers to Merck & Co. Inc.

Antihemorrhagic esters and methods for producing same. No. 2,407,823. Louis Fieser to Research Corp.

Preparation of pyridine-3-acetic acid, comprises reacting pyridine-2-carboxylic acid ester-3-carboxylic acid halide with diazomethane, reacting resulting diazoketone with alcohol, treating reaction product with hydrolyzing agent, partially decarboxylating the carboxylic acid, recovering pyridine-3-acetic acid. No. 2,408.020. Max Hartmann and Karl Miescher, Hans Kaegi and Werner Bosshard to Ciba Pharmaceutical Products, Inc.

P-amino-benzene-sulphamide derivatives, general formula described in patent. No. 2,408,066. Winfrid Hentrich and Erik Schirm.

Hypnotic composition for intramuscular injection comprising solution of barbituric acid in paraldehyde. No. 2,408,289. Milton Bush to Mallinckrodt Chemical Works.

Thiophan-3-one of formula described in patent. No. 2,408,518. Paul Karrer to Hoffmann-La Roche, Inc.

Preparation of antithrombin-free thromboplastin soluble in saline comprises removing part of impurities from extract containing thromboplastin with magnesium hydroxide, adding protein-precipitating salt, separating and redissolving precipitate in physiological saline solution, removing protein-precipitating salt by dialysis of solution against physiological saline solution. No. 2,408,535. Harry Smith to Parke, Davis & Co.

Preparation of antithrom bin-free prothrombin from plasma product containing prothrombin and antithrombin comprises removing by isoelectric precipitation sufficient antithrombins from plasma product to enable magnesium hydroxide to preferentially adsorb prothrombin from antithrombin. No. 2,408,536. Harry Smith to Parke, Davis & Co.

Separating fat soluble vitamins and pro-vitamins from extraneous organic material contained in fat solvent extract of plant materials by dialyzation utilizing membrane capable of diffusing vitamins and pro-vitamins. No. 2,408,625. William Graham, Jr., George Kohler and Richard Hoover to American Dairies Inc. and The Quaker Oats Co.

Surgical dressing material comprising dry textile material having feel and flexibility similar to untreated surgical gauze carrying on fibres impregnation of sulfa compound in proportion equalling 5% of weight of textile and binding agent consisting of cellulose ether. No. 2,408,818. Harry Sobotka to Mount Sinai Hospital Research Foundation, Inc.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,827. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and method for obtaining same. No. 2,408,828. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same No. 2,408,829. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,830. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,831. Romeo Wagner to Parke, Davis & Co.

Pseudokryptogenin and its diacetate. No. 2,408,832. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,833. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,834. Romeo Wagner to Parke, Davis & Co.

Steroidal compounds of formula described in patent and methods for obtaining same. No. 2,408,835. Romeo Wagner to Parke, Davis & Co.

Treating activatable substance to develop anti-rachitic (vitamin D) property, comprises heating and vaporizing substance, subjecting to high frequency electrical discharge between spaced electrodes, while in vapor state. No. 2,408,908. Lester Borchardt to General Mills, Inc.

Esters of dimethylaminoethanol useful as local anesthetics. No. 2,409,001. Robert Shelton and Marcus Van Campen, Jr. to The Wm. S. Merrell Co.

Hydroxylated cyclopentano polyhydrophenanthrene compounds and method of making same. No. 2,409,043. Hans Inhoffen to Schering Corp.

Producing substantially-pure d-tubocurarine chloride essentially comprises treating with picric acid the quaternary-base fraction of crude curare of curarine type, hydrolyzing resulting picrate in emulsion of hydrochloric acid and water-immiscible organic solvent for picric acid, separating precipitated d-tubocurarine chloride from aqueous phase, treating mother liquor with acid-adsorbing resin, drying treated mother liquor, crystallizing residue with minimum quantity of hydrochloric acid. No. 2,409,241. Joseph Bashour to E. R. Squibb & Sons.

Chemotherapeutic sulfanilamide derivatives. No. 2,409,291. William Lott and Raymond Van Winkle to E. R. Squibb & Sons.

Process for preparing hydroxy-pregnane derivatives. No. 2,409,293. Russell Marker to Parke, Davis & Co.

Manufacture of nicotinic acid by oxidizing nicotine nitrate with nitric acid to nicotinic acid nitrate and converting the latter to nicotinic acid; improvement comprises adding aqueous solution of nicotine nitrate to from 9 to 16 parts of strong nitric acid per mol part of nicotine nitrate. No. 2,409,345. Russell Dean and Victor King to American Cyanamid Co.

Tetraacetyl ribonic acid and process of making. No. 2,409,455. Max Tishler to Merck & Co., Inc.

*Metallurgy, Ores

Concentrating fluorspar by froth flotation of pulps containing fluorspar values, comprising adding to pulp sodium fluoride, lignin sulphonate, and fluorspar collecting agent. No. 2,407,651. Julius Clemer and Ballard Clemmons to the Secretary of Interior of the United States of America.

Producing metallic aluminum from low grade sources of alumina containing substantial amounts of silica, such as low grade bauxites, clays, and coal ashes. No. 2,408,241. Lucien Sturbelle.

Austenitic chromium-nickel-iron alloy having high creep resistance to 1800° F. comprising 35% nickel, 15% chromium, 0.5 to 3.0% titanium, 0.5 to 3.5% molybdenum or tungsten, 1.10 to 1.70% silicon, 0.75 to 2.0% manganese, 0.30 to 0.80% carbon, balance iron. No. 2,408,771. Howard German to Driver-Harris Co.

In concentrator and separator table unit for ore-pulp, base plate, transversely arranged divider partition on plate extending from one side wall and terminating in spaced relation from other side wall, second divider partition extending from last-named side wall having free end portion terminating in spaced relation to first-named side wall, discharge hole in plate between free outer end of first-named partitioning divider and adjacent intermediate portion of second divider, etc. No. 2,408,797. Erwin McPheters.

In blast-furnace charging-system having upper receiving-hopper internally at atmospheric-pressure, its cooperating bell, actuating-means opening and closing bell intermittently, lower delivery-hopper and its bell discharging into top of furnace, etc. No. 2,408,945. Albert Mohr, Jr. and John Grilli.

Shock-enduring steel alloy of high hardenability having composition, carbon, 0.40-1.00%; manganese, 0.35-2.50%, silicon, 0.80-2.75%, molybdenum, 0.15-2.90%, titanium, 0.10-0.90%, silicon in excess of titanium, remainder iron. No. 2,409,016. Linwood Brown.

Desulphurizing of molten iron and steel, steps comprise confining commercially pure calcium carbide to small restricted area on surface of body of molten metal, melting calcium carbide by means of electric arc, introducing molten calcium carbide into body of molten metal beneath surface thereof while molten metal is in state of agitation. No. 2,409,020. John Crowe to Air Reduction Co., Inc.

Polishing surface of metal alloy of "Monel" metal and chrome-nickel stainless steels, comprises subjecting alloy to electrolytic action as anode at current density of from ½ to 30 amperes per square inch and in electrolyte containing plurality of ingredients of which the following are necessary ingredients, free sulphuric acid 15% to 55%, second acid selected from vanadic, manganic and permanganic 2% to 20%, balance water. No. 2,409,097. Clements Batcheller.

Aqueous, acid electroplating bath comprises in aqueous medium metal-ion yielding material consisting of mixture of sulfate and of chloride of nickel or cobalt, together with amount of sulfonated aryl aldehyde sufficient to permit brilliant cathodic deposit of metal to be obtained upon passage of electric current from anode comprising said metal through bath to cathode. No. 2,409,119. Meyer Freed to The Seymour Manufacturing Co.

Aqueous electroplating bath for producing by electro-deposition under acid conditions brilliant, cathodic deposit of nickel, which bath comprises in addition to nickel ion yielding material selected from nickel sulfate, nickel chloride, and mixture of nickel sulfate and nickel chloride, thiourea as brightening agent. No. 2,409,120. Meyer Freed and Oscar Stocker to The Seymour Manufacturing Co.

Cleaning aluminum to prepare for welding, consists in preparing aqueous solution of twenty per cent sodium sulphate and ten per cent nitric acid, immersing aluminum in aqueous solution whereby sodium bisulphate is generated in presence of nitric acid to effect desired chemical action of aluminum. No. 2,409,271. Natacha Goldowski to Welding Research, Inc.

In combination of blast furnace having wall comprising shell and lining, cinder notch therethrough, outer cooler for cinder notch projecting

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through furnace wall, monkey cooler within outer cooler and monkey within monkey cooler, etc. No. 2,409,337. Joseph Yuhas.

Preparing coil of aluminum alloy for heat treatment, comprising plurality of spring coils having spaced loops with successive loops of springs adapted to be positioned intermediate adjacent individual coils of metal to retain individual coils in spaced relation during heat treatment. No. 2,409,384. Victor Peterson to The Kawneer Co.

In crusher, frame having upright bore, upstanding column having lower tapered portion extending into bore, split sleeve interposed between tapered column portion and bore, member secured to frame and spanning lower end of bore. No. 2,409,391. Harvey Rumpel to Smith Engineering Works.

Treating bimetallic billet having a less plastic component and a more plastic component assembled together comprising heating billet to bring it to hot rolling temperature of less plastic component, etc. No. 2,409,422. Francis Egan to Superior Steel Corp.

Treating metal oxide mixtures in finely divided form containing iron and chromium oxides for separate recovery of iron and chromium values free from gangue. No. 2,409,428. Daniel Gardner to Virginia Metal Industries, Inc.

Apparatus for hot finishing tin plate stock in form of thin strip having tin coating, comprising in combination pair of refractory walls having opposing faces in close proximity to each other, means carried by walls for maintaining faces at temperatures higher than melting point of tin, means normally moving strip rapidly through space between walls, means responsive to speed of strip for increasing distance between faces when speed of strip diminishes. No. 2,409,431. Frederic Hess to Selas Corp. of America.

Extruded pipe for use under conditions requiring high creep resistance and high tensile strength, composed of lead and silver, containing 0.7% to 1.5% of silver, balance being lead. No. 2,409,540. William Butcher and Arnold Lloyd to Goodlass Wall & Lead Industries, Ltd.

*Organic

Preparing aliphatic polycarboxylic amino acids comprises reacting aliphatic amine having at least one replaceable hydrogen atom attached directly to amino nitrogen atom, with alkali metal cyanide and formaldehyde-yielding substance. No. 2,407,645. Frederick Bersworth to The Martin Dennis Co.

Process for synthesis of 1-alkyl-8-methyl hexahydroindanone-4. No. 2,407,672. Nicholas Milas to Research Corp.

Process for synthesis of 1-keto-8-methylhexahydroindanol-1. No. 2,407,673. Nicholas Milas to Research Corp.

Separating carbazole from anthracene cake in "fusion" method, improvement comprising: mixing and agitating anthracene cake, in absence of solvent-diluent, with solid potassium hydroxide while heating mixture to temperature to fuse anthracene cake but preventing temperature from rising above 235° C., separating by filtration potassium carbazolate crystals from resulting liquid mass. No. 2,407,677. John O'Brochta and Hugh Rodman, Jr. to Koppers Co., Inc.

Production of halogenated hydrocarbon by passing over supported mercuric chloride catalyst a gaseous mixture of hydrogen halide and acetylene. No. 2,407,701. David Jones and Maddison Phillipson to Imperial Chemicals Industries, Ltd.

New amino amide compounds of general formula described in patent. No. 2,407,703. Saul Kaplan to Onyx Oil & Chemical Co.

Reacting compound from group consisting of hydroxy chromans and hydroxy coumarans with Grignard reagent, reacting resultant mixture with polybasic acid anhydride, and acidifying reaction mixture. No. 2,407,726. Lee Smith and William Renfrow, Jr. to Regents of the University of Minnesota.

Continuous process for production of aliphatic-hydrocarbon chlorides from hydrogen chloride and aliphatic hydrocarbons comprises passing oxygen containing gas and hydrogen chloride in contact with cuprous chloride in reaction zone from 200° C. to 475° C. to form cupric chloride, removing water vapor, contacting cupric chloride with at least one aliphatic hydrocarbon at above 325° C. circulating reformed cuprous chloride to first reaction zone and recovering aliphatic-hydrocarbon chloride. No. 2,407,828. Everett Gorin to Socony-Vacuum Oil Co., Inc.

Production of acrylonitrile comprises passing succinonitrile over catalyst selected from activated carbon, alumina, bauxite and alumina adsorbed on silica at temperature of 300° to 500° C., cooling resulting gases and separating acrylonitrile from hydrogen cyanide and other products. No. 2,407,848. Gardner Ray to Phillips Petroleum Co.

Recovering adipic acid and hexamethylene diamine suitable for reuse from polymeric hexamethylene adipamide waste, comprises repeatedly hydrolyzing mass containing adipamide with mineral acid, removing adipic acid from hydrolyzed mixture of each hydrolyzing step. No. 2,407,896. Clovis Myers to E. I. du Pont de Nemours & Co.

Making pentaerythritol comprising condensing acetaldehyde and formaldehyde in presence of alkaline material, adding acidic precipitant for metal ion of alkaline material freeing formic acid, treating resulting mixture with monohydric alcohol, etc. No. 2,407,920. Richard Cox to Hercules Powder Co.

Ester of carboxylic organic acid and trimethyl butyl hexahydrobenzyl alcohol. No. 2,407,937. Alfred Rummelsburg to Hercules Powder Co.

Simultaneously carbalkoxylating and metallating acetophenone, comprises mixing compound with anhydrous alcoholate of alkali metal and large excess of dialkyl carbonate. No. 2,407,942. Vernon Wallingford and August Homeyer to Mallinckrodt Chemical Works.

A p-substituted benzene sulfonamido pyrimidine compound having formula described in patent. No. 2,407,966. James Sprague to Sharp & Dohme, Inc.

Electrolytic pinacol production. No. 2,408,036. Charles Boettger, Jr., Thomas Chambers and Ober Slotterbeck to Standard Oil Development Co.

Reacting thiolacetic acid in presence of amine with organic halogen compound having halogen of atomic weight of at least 20 attached to only singly-bonded, non-aromatic carbon. No. 2,408,094. Albert Pavlic to E. I. du Pont de Nemours & Co.

Making alpha-halogeno-beta-acetylthiopropionic compound comprises reacting thiolacetic acid with alpha-halogeno-acrylic compound of class consisting of alpha-chloroacrylic acid and its methyl ester. No. 2,408,095. William Peppel to E. I. du Pont de Nemours & Co.

Polyhydroxyamino compounds. No. 2,408(096. John Pierce and John Wotiz; said Wotiz to said Pierce.

Electrolytic production of pinacols. No. 2,408,101. Ober Slotterbeck to Standard Oil Development Co.

Production of high molecular weight polyene aldehydes, comprises subjecting crotonaldehyde to condensation reaction in reaction medium comprising water, lower aliphatic alcohol and condensation catalyst comprising member of secondary amines and salts thereof. Higher molecular weight mono- and poly-hydroxy alcohols prepared by subjecting crotonaldehyde to condensation reaction. No. 2,408,127. George Seymour and Victor Salvin to Celanese Corp. of America.

Production of 2-methyl-1,2-propanediamine, comprise reacting 2-methyl-2-nitro-1-propanol with ammonia under pressure at 20 to 85° C., subjecting resultant mixture to hydrogenation in presence of a hydrogenation catalyst at elevated temperature and pressure. No. 2,408,171. Harold Johnson to Commercial Solvents Corp.

Production of 2-methyl-1,2-propanediamine, comprise subjecting 2-nitropropane, ammonia, and formaldehyde at elevated temperature and pressure, then subjecting resultant mixture to hydrogenation in presence of a hydrogenation catalyst at elevated temperature and pressure. No. 2,408,172. Maryan Matuszak to Phillips Petroleum Co.

Manufacturing methyl acrylate comprises thermally decomposing methyl alpha-acetoxypropionate at temperature of 400° to 600° C. and pressure of 3 to 60 atmospheres. No. 2,408,177. William Ratchford and Charles Fisher to the Secretary of Agriculture of the United States of America.

Producing fatty acid esters of d-isoascorbic acid said esters containing unsubstituted ene-diol group comprising reacting calcium 2-ketogluconate with saturated fatty acid containing 12 to 18 carbon atoms in presence of concentrated sulfuric acid. No. 2,408,182. Percy Wells and Daniel Swern to the Secretary of Agriculture of the United States of America.

Aromatic amine salt of 3-methyl-butyl, 2-ethyl-hexyl orthophosphate. No. 2,408,232. Herschel Smith and Troy Cantrell to Gulf Oil Corp.

Hydrolyzing aliphatic sulphonyl chloride by reacting with aqueous caustic alkali, improvement consists in effecting reaction in presence of organic nitrogenous base. No. 2,408,300. Thomas Dillon to E. I. du Pont de Nemours & Co.

Beta-phenyl-alpha-alpha-dimethyl-alpha-amino ethane. No. 2,408,345. Robert Shelton and Marcus Van Campen, Jr. to The Wm. S. Merrell Co.

Product obtained by condensing ketone with primary aminoindan in presence of acidic condensation catalyst, aminoindan having amino group directly attached to carbon atom of aromatic ring and having hydrogen atom attached to at least one of adjacent nuclear aromatic carbon atoms. No. 2,408,391. Carlin Gibbs to The B. F. Goodrich Co.

Treating glyceride oil containing natural color bodies to decolorize same comprises intimately contacting glyceride oil with preformed hydrous alkali metal soap of saturated and unsaturated fat acids. No. 2,408,454. Francis Sullivan.

4-keto-tetrahydrothiophenes carrying substituents in 2-position selected from alkyl, substituted-alkyl, aryl, fatty acid and fatty acid ester groups. No. 2,408,519. Anthony Avison, Franz Bergel, and John Haworth to Roche Products, Ltd.

Forming scratch resistant article comprising forming bath containing compound selected from aluminum ethoxide, ethyl silicate, magnesium methoxide and magnesium ethoxide dissolved in liquid selected from xylol, methyl alcohol, and anhydrous ethyl alcohol, placing blank of organic synthetic resin of type capable of being superficially softened by bath and having water therein of amount to react with compound in bath between forming dies having finished optical surfaces, etc. No. 2,408,540. William Ewart Williams.

Manufacture of nitro compounds of formula described in patent. No. 2,408,607. Gerard Buckley to Imperial Chemical Industries, Ltd.

Production of substituted quinazolones from organic phosphazo compounds. No. 2,408,633. Alfred Guenther and Jack Morgan to General Aniline & Film Corp.

Preparing acyl guanidines comprises reacting guanidine carbonate with alkali metal in anhydrous solvent selected from ethyl alcohol and p-dioxane, concentrating resulting solution of guanidine, reacting with ester of acid selected from alkyl, aryl and mixed alkyl and aryl carboxylic acids. No. 2,408,694. John Simons and Welcome Weaver to Libbey-Owens-Ford Glass Co.

Wax-like heat-reaction product of stoichiometrical proportions of aliphatic polyamine and halogenated aromatic compound selected from nuclearly halogenated aromatic monocarboxylic and ortho-dicarboxylic acids and acid halides. No. 2,408,700. Murray Sprung to General Electric Co.

Making toluene in high concentration from petroleum naptha comprises contacting naptha at 850 to 1100° F. with catalyst free of alkali metals consisting of alumina gel promoted with 5 to 10 per cent of molybdenum oxide. No. 2,408,724. James Bailie and Rodney Shankland to Standard Oil Co.

Making esters of phosphorous acid comprises reacting compound selected from alcohols and phenols with phosphorus trichloride in presence of organic base having tertiary nitrogen atom. No. 2,408,744. Karl Engel to Allied Chemical & Dye Corp.

Preparing coal for coking, comprising storing, conveying and preheating of raw coal in coarser grain sizes, adapted to protect coal against deleterious action of air and carbon dioxide, segregating hot coal into size classes, pulverizing larger size class to greater fineness, to produce reduced bulk density of coal when mixed with smaller size-class, intimately mixing several classes, accumulating mixture in charge hopper, ready for coking. No. 2,408,810. Franz Puening.

Production of acrylyl compound comprises adding vinylidene chloride to mixture of sulfuric acid and formaldehyde polymers thereof, mixture containing water such that concentration of sulfuric acid is not greater than 85%. No. 2,408,889. Nancy Short to Imperial Chemical Industries, Ltd.

Non-toxic surface-active choline-like compounds of formula described in patent. No. 2,408,893. Kenneth Swan and Norman White.

Isoascorbic compounds represented by formula described in patent. No. 2,408,897. Percy Wells and Daniel Swern to the Secretary of Agriculture of the United States of America.

Preparing esters of polyhydroxy compounds and unsaturated higher fatty acids comprises saturating unsaturated bonds of unsaturated higher fatty acid by halogenation to form saturated higher fatty acid, converting acid into acid chloride, reacting acyl derivative with at least one hydroxyl group of polyhydroxy compound to form ester, dehalogenating acid radical portion of ester to reestablish unsaturated bonds. No. 2,408,905. Howard Black and Charles Overley to Industrial Patents Corp.

Preparation of tertiary alkyl mercaptans having twelve carbon atoms per molecule by catalytic addition of hydrogen sulfide to tertiary olefin polymers having twelve carbon atoms per molecule wherein crude reaction product is formed comprising tertiary mercaptans having twelve carbon atoms per molecule, mercaptans having eight carbon atoms per molecule, mercaptans having four carbon atoms per molecule, and unreacted olefin polymers. No. 2,408,920. Harry Drennan to Phillips Petroleum Co.

Separating isoprene from mixture with mono-olefins and paraffins having vapor pressures close to isoprene comprises adding isopropylamine to mixture in quantity to form constant boiling azeotropes with each component, subjecting mixture to fractional distillation to distill off

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azeotropic fraction made up of components other than isoprene, continuing distillation at higher still head temperature to obtain azeotropic fraction which predominates in isoprene. No. 2,408,922. Theodore Evans, Rupert Morris, and Edward Shokal to Shell Development Co.

Separating nordihydroguaiaretic acid from crude extract containing nordihydroguaiaretic acid and impurities dissolved in low aliphatic ether solvent comprises adding ethylene dichloride to extract, evaporating ether solvent and portion of ethylene dichloride until solution is reduced to consistency of thin syrup, crystallizing nordihydroguaiaretic acid, washing impurities by means of ethylene dichloride. No. 2,408,924. Ole Gisvold to Regents of the University of Minnesota.

Production of ester of carboxylic acid comprises: reacting nitrile with olefin in presence of water and strong acid selected from sulfuric acid, phosphoric acid, and benzenesulfonic acid, maintaining temperature at 40° to 200° C., pressure to maintain liquid phase. No. 2,408,940. John Mahan to Phillips Petroleum Co.

Manufacturing primary amines by catalytically hydrogenating nitriles in presence of ammonia, distilling primary amines from secondary amines formed in hydrogenation, step of adding secondary amine residues to each succeeding batch of nitrile to be hydrogenated. No. 2,408,959. Lou Stegemeyer to Emery Industries, Inc.

Purification of diolefins contaminated by presence of small proportions of acetylenes of same boiling points, comprises reacting hydrocarbon mixture containing acetylenes and diolefins with water in vapor phase in presence of catalyst at 300° C. and partial pressure of diolefins below 100 mm. of mercury. No. 2,408,970. Thomas Doumani and Davis Skinner to Union Oil Co. of California.

Isolating coal tar base from mixture containing plurality of such bases, steps comprise reacting mixture with phosphoric acid in medium in which saturation solubility of phosphate of base to be isolated is low to form phosphate of base together with other base phosphates, inoculating reaction mixture with crystal of phosphate of base to be isolated to cause precipitation. No. 2,408,975. Karl Engel to Allied Chemical & Dye Corp.

Preparing alkoxy acetals by reaction of alkali metal alkoxide with diethyl acetal of chloracetaldehyde, improvement comprises carrying out reaction in presence of inorganic iodide. No. 2,409,015. Carl Bordenca and Clifford Thor to The Visking Corp.

Manufacturing dialkyl phosphate derivatives comprises reacting aliphatic alcohol with phosphorus trichloride to form crude product containing dialkyl hydrogen phosphite and chlorinating product to produce corresponding dialkyl chlorophosphate. No. 2,409,039. Edgar Hardy and Gennady Kosolapoff to Monsanto Chemical Co.

Beta-amino, beta-propyl glutaro-nitriles and process of preparing them. No. 2,409,061. Richard Norris to Sinclair Refining Co.

Alkylating benzene comprises contacting mixture of benzene and sulfur compound selected from alkyl mercaptans and alkyl sulfides with copper pyrophosphate at 200-525° C. No. 2,409,080. Carlisle Thacker and Richmond Bell to The Pure Oil Co.

Reaction products of nitriles and aldehydes. No. 2,409,086. Joseph Walker to E. I. du Pont de Nemours & Co.

Diaryl guanidine addition products. No. 2,409,109. Arnold Davis to American Cyanamid Co.

Preparing acrylonitrile comprises reacting acetylene and hydrocyanic acid in aqueous solution of cuprous halide as catalyst at 60° to 100° C. No. 2,409,124. Ralph Heuser to American Cyanamid Co.

Quinonylamino-n-alkylenesulfonic acids as printing aids. No. 2,409,127. Roy Kienle and Chester Amick to American Cyanamid Co.

Chemical compounds from group consisting of derivatives of 5-amino-1,3-benzodioxole represented by formula described in patent. No. 2,409,133. Hans Lecher and John Goulding to American Cyanamid Co.

Derivatives of 6-amino-1,3-benzodioxan. No. 2,409,134. Hans Lecher, John Goulding and Robert Parker to American Cyanamid Co.

Separating tall oil into useful fractions comprises **mixing tall oil** with liquid ester of levulinic acid to form apparently homogeneous solution, allowing solution to stand at room temperature until waxy solid precipitates, separating precipitate from supernatant and cooling to below room temperature whereby fraction consisting largely of fatty acids precipitates. No. 2,409,137. Kermit Longley to Quaker Chemical Products Corp.

Production of rosin ester of low unsaturation from rosin of high unsaturation, process for concurrently effecting esterification and reduction of unsaturation, consists in heating rosin to 150° C. to 300° C. and subjecting heated rosin to action of alcohol and of from 0.5% to 25% by weight of rosin of sulfur. No. 2,409,173. Frederick Webb to Ridbo Laboratories, Inc.

Recovering resin from resin-bearing coal of Utah type wherein resin is separated from bulk of coal to produce resin concentrate consisting of resin admixed with coal, steps comprise heating resin concentrate to 185° C. dissolving resin content of concentrate in hydrocarbon solvent, separating insoluble coal from resin solution by filtration. No. 2,409,216. Ernest Lee to Interchemical Corp.

Isolating butadiene fraction from gas mixture containing butadiene and hydrocarbons of greater volatility than butadiene, comprises scrubbing mixture with solvent to obtain solution containing butadiene and more volatile hydrocarbons, and scrubbed gas free of butadiene, distilling solution and removing butadiene fraction at point below head of column and above feed point, etc. No. 2,409,250. Edward Cannon and Herbert Stuewe to Carbide & Carbon Chemicals Corp.

Polyfluoroethyl ether containing at least three fluorine atoms attached to ethyl group, of which at least one fluorine atom is attached to alpha carbon atom. No. 2,409,274. Willam Hanford and George Rigby to E. I. du Pont de Nemours & Co.

From water-soluble to water-dispersible aliphatic carboxylic acid esters of aliphatic hydroxy-polycarboxylic acids, aliphatic carboxylic acid radical of which contains less than 6 carbon atoms, at least one carboxyl group of hydroxy-polycarboxylic acid being amide-linked to carboxylic acid amide of polyamine containing at least one free primary amino group, said amide-linkage occurring through primary amino group of carboxylic acid amide of polyamine. No. 2,409,275. Benjamin Harris.

Unsaturated amines and process for making same. No. 2,409,287. Morris Kharasch and Charles Fuchs to Eli Lilly & Co.

Fluoroacetamide of general formula described in patent. No. 2,409,315. George Rigby and Herman Schroeder to E. I. du Pont de Nemours & Co.

Ester of polyalkyl cyclohexanol and thioclyano-substituted aliphatic carboxylic acid, which contains no more than three alkyl radicals directly linked to nuclear carbon atoms of cyclohexyl radical, all alkyl radicals are directly linked to nuclear carbon atoms by primary carbon atoms, one of alkyl radicals directly linked to nuclear carbon atom in 5 position relative to acid radical, and other alkyl radicals directly linked to nuclear carbon atom in 3 position relative to acid radical. No. 2,409,329. Paul Williams to Shell Development Co.

Improved process for reacting ethylene and isobutane to form diisopropyl, comprises conducting reaction in two sets of reactors having two reactors in each set, passing portion of isobutane feed to bottom of first reactor of each set, passing portion of isobutane-ethylene feed to bottom of each reactor, and also to intermediate point of first reactor of set, passing from common catalyst source portion of liquid aluminum chloride-hydrocarbon complex catalyst to bottom of first reactor of each set, etc. No. 2,409,389. Clarence Ringham to Phillips Petroleum Co.

*Packaging

Rendering container of fibrous material impervious and increasing rigidity of container comprising placing in outer shell of fibrous stock liquid filler which is normally solid, inserting inner shell of fibrous stock, extrude filler between walls of shells, allowing filler to solidify. No. 2,407,639. Frank Gilbert, Jr.

In combination with capping machine having closure hopper and capping head, feed chute for conducting closures from hopper to capping head, suction means communicating with chute for removing dust and foreign particles from chute and closures, and means for providing balanced pressure around closures. No. 2,407,751. Robert Stewart to Crown Cork & Seal Co.

Method and apparatus for sealing cartons. No. 2,407,781. Reynolds Guyer to Waldorf Paper Products Co.

Flat tubular four-sided carton blank folded along two parallel longitudinal score lines, heat-sealable liner sheet adhered to inner surface of tubular carton blank, etc. No. 2,407,802. Herbert Stotter.

Apparatus for mixing and filling beverages. No. 2,408,107. Robert Stewart to Crown Cork & Seal Co.

In apparatus for filling and discharging receptacles, means for feeding material to receptacle, one-revolution clutch, manual means for closing clutch, means responsive to operation of clutch for initiating feed of material to receptacle, adjustable means for opening clutch during course of its one revolution, weighing means, means responsive to action of weighing means for stopping feed of material to the receptacle, etc. No. 2,408,225. William Peterson to St. Regis Paper Co.

Closure device comprises rotatable closure body provided with pair of spaced recesses opening outward, each shouldered to provide neck portion and enlarged inner portion with closed base, peg slidably mounted in each recess for movement between elevated and depressed positions and rotatable in depressed position, etc. No. 2,408,233. Sydney Smith to Imperial Chemical Industries, Ltd.

In container capping apparatus, base, straight-line steam tunnel mounted on base, tunnel including top wall and two side walls to define inlet and outlet at respective opposite ends of walls, conveyor means carried by base to move containers through tunnel, top wall of tunnel positioned to lie adjacent mouths of containers, means carried by and below tunnel top wall to apply and seal caps upon containers, etc. No. 2,408,447. Harry Rau to Crown Cork & Seal Co., Inc.

Bottle closure comprising hollow body portion provided at lower end with plurality of valve-sealable openings, core member positioned interiorly within body portion spaced therefrom to provide path for fluids, core portion provided at lower end with plurality of recesses to guide freely movable valve-members capable of obturating openings but limited as to movement by space between recesses and interior surface of body portion. No. 2,408,634. **Harry Hagen.**

*Paints, Pigments

Temporary powder paint characterized by ready solubility before and after application, in aqueous alkali, alcohol, gasoline, painter's naphtha, and similar solvents, and resistance to atmospheric conditions for short periods of time, comprising dispersion of pigment in reaction product of rosin with 65%-75% of molar equivalent of monoethanolamine to form rosin ester, reaction product containing free acid. No. 2,408,814. George Selden to Interchemical Corp.

Intaglio printing ink comprising coloring matter dispersed in vehicle comprises solution of Utah type coal resin in aliphatic hydrocarbon solvent having volatility in range between benzene and toluene. No. 2,409,214. Ernest Lee to Interchemical Corp.

Heat drying printing ink comprising pigment dispersed in vehicle comprises solution of coal resin free from coal in petroleum hydrocarbon solvent substantially non-volatile at 20° C. and volatilizes readily when heated to 150° C. No. 2,409,215. Ernest Lee to Interchemical Corp.

Chemical-resistant and non-tacky film-forming paint composition comprising in 100 parts by weight 12 to 15 parts by weight of polybutenes having molecular weights between 60,000 and 300,000 as determined by Staudinger viscosity method, 55 to 70 parts by weight of volatile hydrocarbon liquid, 4 to 8 parts by weight of an alkanol having 1 to 3 carbon atoms per molecule dissolved in volatile hydrocarbon liquid with polybutenes, remaining parts being suspended solid filler with small amount of wetting agent. No. 2,409,336. David Young to Jasco, Inc.

*Paper and Pulp

In Fourdrinier paper making machine, including moving wire member for supporting wet paper stock, suction box below portion of member, smooth wear-resistant cover on box, cover consisting of plurality of elongated wax-impregnated end-of-grain wood blocks which extend transversely across suction box at angle to line of travel of moving wire member. No. 2,408,176. Jean Proulx.

Treatment of sulfite wood pulp, comprises forming slurry comprising 8% by weight of sulfite wood pulp in 7% aqueous solution of sodium hydroxide, digesting slurry at 90 to 103° C. for 1 hour, treating digested slurry with 2% aqueous solution of chlorine for 30 minutes, subjecting treated slurry to plurality of treatments with aqueous solutions of sodium hydroxide at 50 to 60° C. and aqueous solutions of chlorine, said solutions being of lower concentration than solutions employed in initial treatment, etc. No. 2,408,849. Clifford Haney, Mervin Martin and Troy Andrews to Celanese Corp. of America.

Straining fibrous suspensions, particularly paper pulp, comprising supplying pulp to be strained to bottom surface of strainer element having straining slots which have side walls which are divergent upwardly, etc. No. 2,409,524. Sten Einarsson Ahlfors.

*Petroleum

Improved method for catalytic dehydrogenation of hydrocarbons selected

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from class of mono-olefins and aralkyls having at least two carbon atoms in alkyl group comprises contacting hydrocarbon diluted with 1 to 30 volumes of steam per volume of hydrocarbon at 1000° F. to 1600° F. with catalyst comprising major portion of zinc oxide and minor portion of oxide, selected from iron oxide, manganese oxide, cobalt oxide, nickel oxide and chromium oxide, and minor proportion of promoter comprising potassium oxide. No. 22,800. Kenneth Kearby to Standard Oil Development Co.

Continuous process for production in vapour phase of branched chain alkanes from normal alkane feedstock by isomerization at moderate reaction temperature and at atmospheric pressure to 50 atmospheres, consisting in contacting stream of normal alkane feedstock with solid unsupported aluminum halide, etc. No. 2,407,637. Eric Fawcett to Anglo-Iranian Oil Co., Ltd.

Composition of matter consisting of cyclopentane and neohexane and containing about 30 to 90% by volume of cyclopentane which is substantially free from normal pentane and is characterized by boiling range of 120 to 124° F. No. 2,407,716. Robert Marschner to Standard Oil Co.

Aviation combat fuel showing high supercharge octane number and high rich mixture response comprising blend of 40% to 80% commercial isooctane and 20% to 60% of 1,1,2-trimethylcyclopropane. No. 2,407,717. Robert Marschner to Standard Oil Co.

Super aviation fuel comprising between 85 and 60 volume percent isooctane and between 15 and 40 volume percent of azeotropic mixture comprising between 40 and 60 volume percent of diisopropyl and between 60 and 40 volume percent of acetone. No. 2,407,718. Robert Marschner and Don Carmody to Standard Oil Co.

Conversion of hydrocarbons of higher boiling point to motor fuel of high quality comprises subjecting liquid hydrocarbon to cracking conditions of time, temperature and pressure to convert substantial portion of gasoline and other portions to olefines, in presence of solid, particle-form adsorptive contact mass maintained in suspension in charge. No. 2,407,817. Arthur Danner to Socony-Vacuum Oil Co., Inc.

Separately recovering plurality of successively higher-boiling aromatic hydrocarbons from mixture containing them and non-aromatic hydrocarbons which, upon distillation of mixture, normally form low-boiling azeotropes with aromatic hydrocarbons. No. 2,407,820. Emmett Durrum to Shell Development Co.

Continuous process of separating aliphatic conjugated diolefin from admixture with close-boiling corresponding olefin and paraffin comprises continuously feeding diolefin-containing mixture and from one-half to three times its weight of sulfur dioxide into fractional distillation column, etc. No. 2,407,825. Frederick Frey and Robert Snow to Phillips Petroleum Co.

Breaking petroleum emulsions of oil-in-water type, characterized by subjecting emulsion to action of surface-active heat-polymerized aminoalcohol of formula described in patent. No. 2,407,895. Louis Monson, William Anderson and Fred Jenkins to Petrolite Corp., Ltd.

Effecting catalytic conversion of hydrocarbon at elevated temperature with catalyst consisting of minor effective amount of boric oxide and major amount of relatively inert catalyst carrier, improvement comprises forming mixture of steam and boric acid, passing mixture through reaction zone with fluid hydrocarbon reactant. No. 2,407,918. James Burgin to Shell Development Co.

Lubricant comprising lubricating oil and oil-soluble, polymerized ester of formula described in patent. No. 2,407,954. Merrell Fenske and George Cummings to Rohm & Haas Co.

Separating isoprene from refinery cracked stock comprises subjecting stock to distillation in presence of aqueous acetone to obtain azeotropic mixture containing isoprene as distillate, subjecting distillate to extractive distillation in presence of acetone, separating distillate fraction containing isoprene in high concentration, fractionally distilling resultant material to obtain isoprene. No. 2,407,997. John Patterson to Standard Oil Development Co.

Separating propylene from ethylene comprises scrubbing gas containing two with boron fluoride-sulfuric acid catalyst mixture under conditions for selective polymerization of propylene. No. 2,408,010. Edward Wadley and Joseph Horeczy to Standard Oil Development Co.

Distillation of hydrocarbons which have been contacted with sulfuric acid, step of adding to hydrocarbons, prior to distillation, small amount of alkali metal salt of phenol. No. 2,408,011. David Walsh, Jr. and Elza Camp to Standard Oil Development Co.

In continuous isomerization process in which normal paraffin of at least four carbon atoms per molecule in admixture with promotional amounts of hydrogen halide are contacted under isomerization reaction conditions with catalyst bed comprising anhydrous aluminum halide adsorbed on porous support, steps of replacing, at intervals hydrogen halide in feed mixture with anhydrous aluminum halide without altering conditions of operation. No. 2,408,018. Otto Gerbes to Standard Oil Development Co.

Improving lubricating oils to decrease sludge formation and decrease tendency to cause corrosion of metal surfaces comprising treating entire body of oil with small amount of phosphatide and mononuclear aromatic sulfur containing compound. No. 2,408,090. Sidney Musher to Musher Foundation Inc.

Improved mineral oil composition comprising major amount of mineral oil and minor amount of oil-soluble trivalent metal salt of N-alkyl, alkylol ortho phthalamidic acid. No. 2,408,103. Herschel Smith, Troy Cantrell and John Peters to Gulf Oil Corp.

Dehydrogenating hydrocarbons having from 2 to 5 carbon atoms comprises passing hydrocarbons at dehydrogenating temperatures and pressures over catalyst of major proportion of aluminum oxide and minor equal proportions of chromium oxide and nickel heated to 1800° to 2000° F. No. 2,408,131. Alexis Voorhies, Jr. to Standard Oil Development Co.

Continuous production of diolefin from corresponding mono-olefin by catalytic dehydrogenation comprises continuously contacting mono-olefin having at least four non-quaternary carbon atoms in straight chain in presence of two mols of steam per mol of mono-olefin at 580° C. and at gaseous hourly space velocity between 300 and 3000 with dehydrogenation catalyst of homogeneous mixture of iron oxide, bismuth oxide and potassium oxide. No. 2,408,139. Carlos Gutzeit to Shell Development Co.

Catalyst adapted for effecting dehydrogenation at temperatures above 580° C. in presence of steam consisting of major mol amount of iron oxide, minor mol amount of alkaline compound of potassium and minor mol amount of at least one mol per cent of chromium oxide. No. 2,408,140. Carlos Gutzeit to Shell Development Co.

Improved process for catalytic dehydrogenation of low molecular weight olefins, comprises adding steam to olefins in ratio of 15:1 to 1:1 of steam to olefins, passing mixture at 1000 to 1600° F. over catalyst comprising major proportion of magnesium oxide and minor proportion of chromium oxide and alkaline oxide. No. 2,408,146. Kenneth Kearby to Jasco, Inc.

Improved process for production of monoalkyl derivative of alkylatable aromatic hydrocarbon, comprises passing hydrocarbon mixture comprising olefin hydrocarbon of not more than 6 carbon atoms per molecule and molar excess of alkylatable aromatic hydrocarbon together with not more than 1 per cent by weight of reactants of hydrogen chloride through bed of solid granular catalyst, etc. No. 2,408,167. Harold Hepp to Phillips Petroleum Co.

Improved process for alkylation of aromatic hydrocarbon, comprises alkylating and alkylatable aromatic hydrocarbon in presence of liquid alkylation catalyst comprising hydrofluoric acid. No. 2,408,173. Maryan Matuszak to Phillips Petroleum Co.

In continuous process for converting hydrocarbons by action of aluminum halide-hydrocarbon complex catalyst of predetermined activity in presence of hydrogen halide steps which comprise maintaining reaction tower filled with column of feed hydrocarbon in continuous liquid phase, tower being packed with inert contact material, etc. No. 2,408,186. Harold Atwell and Howard Gross to The Texas Co.

Preparing complex catalyst formed by reacting aluminum chloride with kerosene in presence of hydrogen halide comprises maintaining in contact zone aluminum chloride in solid granular form, circulating through contact zone in contact with solid halide stream of saturated aliphatic C_4 hydrocarbons in liquid phase, etc. No. 2,408,187. Harold Atwell to The Texas Co.

Conversion of hydrocarbons in reaction catalyzed by aluminum chloride comprises contacting hydrocarbon with aluminum chloride in reaction zone, passing vaporous effluent from reaction zone containing hydrocarbon vapors and aluminum chloride vapors into contact with liquid antimony trichloride effecting separation of aluminum chloride vapors from hydrocarbon vapors. No. 2,408,294. Samuel Carney to Phillips Petroleum Co.

Alkylating paraffinic hydrocarbon having at least three carbon atoms with olefinic hydrocarbon having at least three carbon atoms, improvement comprises contacting paraffinic hydrocarbon and olefinic hydrocarbon with hydrogen fluoride alkylation catalyst in reaction zone, in presence of material selected from chlorine, bromine, and iodine. No. 2,408,329. Jacob Meadow to Socony-Vacuum Oil Co., Inc.

Isomerization of saturated hydrocarbon charging stock comprises commingling with charging stock a recycle stock. No. 2,408,548. Herman Bloch to Universal Oil Products Co.

Production of motor fuel comprises subjecting relatively heavy hydrocarbon oil to pyrolytic cracking in heating coil and communicating reaction chamber, separating non-vaporous liquid residue from pyrolytically formed vaporous conversion products, commingling slurry of cracking catalyst with light hydrocarbon oil and passing mixture through reaction zone wherein it is heated to catalytic cracking temperature, etc. No. 2,408,580. Davis Read, Jr. to Universal Oil Products Co.

Minimizing corrosion in oil cracking still, comprises supplying to stream undergoing heating, successive increments of adsorbent consisting of calcium hydroxide, adapted to react with corrosive compounds generated by decomposition of ingredients in oil. No. 2,408,584. Arthur Smith to Jenkins Petroleum Process Co.

Catalytic conversion of hydrocarbons comprises flowing granulated catalyst downwardly by gravity through successive zones of reaction and regeneration, introducing hydrocarbons into reaction zone and maintaining elevated conversion temperature while hydrocarbons flow through reaction zone countercurrently to flowing catalyst, etc. No. 2,408,600. Clyde Berg to Union Oil Co. of California.

Converting olefin hydrocarbons in which olefin hydrocarbons are absorbed in acid polymerizing catalyst at temperatures below polymerizing temperatures and extract obtained is heated under pressure to temperature to polymerize absorbed olefins in liquid phase, improvement comprises mixing extract while at temperature below polymerizing temperatures and at polymerizaing pressure with hydrocarbon vapors comprising substantial proportion of isoparaffin hydrocarbon boiling above polymerizing temperature at polymerizing pressure etc. No. 2,408,725. Arnold Belchetz to The M. W. Kellogg Co.

Converting normal to slightly branched hydrocarbons to highly branched isomers by unitary two-stage process. No. 2,408,752. Robert Burk to The Standard Oil Co.

Heating hydrocarbons to high temperature for short time to form ethylene and propylene, C_4 and C_5 aliphatic hydrocarbons, and aromatics, separating C_3 and lighter hydrocarbons containing propylene and ethylene, aliphatic fraction selected from C_4 hydrocarbons, C_5 hydrocarbons and mixture thereof, comprising normal paraffinic hydrocarbon, and C_6 and heavier hydrocarbon fraction containing aromatics, etc. No. 2,408,753. Robert Burk to The Standard Oil Co.

Alkylating isoparaffin with mixture of different olefins comprises adding mixed olefin feed to mixture of isoparaffin and $AlCl_3$-hydrocarbon complex catalyst prepared by agitating, prior to alkylation reaction proper, suspension of $AlCl_3$ in isoparaffin while adding olefin in small increments until dark reddish brown mobile liquid catalyst consisting of aluminum chloride-hydrocarbon complex catalyst is formed. No. 2,408,798. Richard Meinert to Standard Oil Development Co.

In hydrocarbon conversion process wherein desired hydrocarbon conversion reaction is catalyzed by means of aluminum halide catalyst and hydrogen halide promoter, continuous method of operation comprises passing at least portion of hydrocarbon to be converted in liquid phase, in absence of promoter upwardly through bulk supply of aluminum halide disposed in catalyst supply zone. No. 2,408,941. Julian Mavity and Walter Moss to Universal Oil Products Co.

Catalytic conversion of hydrocarbons wherein finely divided catalyst particles are contacted in reaction zone with hydrocarbons at conversion conditions, resultant contaminated catalyst continuously withdrawn and contacted in regeneration zone with oxygen-containing gas to remove contaminant by combustion and regenerated catalyst continuously withdrawn and returned to reaction zone, improvement comprises passing contaminated catalyst downwardly prior to regeneration through coking zone in countercurrent contact with upwardly flowing hot spent regenerating gas. No. 2,408,943. Lev Mekler to Universal Oil Products Co.

Catalytically reforming low boiling hydrocarbon reactants of gasoline and naphtha boiling range into high anti-knock motor fuels, comprises heating low boiling hydrocarbon reactant charging stock with hydrogen-bearing gas having 50 mol per cent hydrogen in heating zone at superatmospheric pressure from 150 to 800 lbs. per sq. in. ga. to reaction temperature of 925 to 1050° F. in short period of time, passing heated reactants into contact with reforming catalyst bed in enclosed zone at suitable space velocity to effect temperature drop from 25 to 100° F. between entry and exit of reactants, etc. No. 2,408,948. Cecilio Ocon and Ernest Ocon; said Cecilio Ocon to said Ernest Ocon.

Conversion of hydrocarbons wherein hydrocarbon charging stock is converted in reaction zone in presence of hydrogen halide, comprises separating from products of conversion step gas mixture containing hydrogen halide and normally gaseous hydrocarbons, contacting mixture

with solid adsorbent to separate hydrogen halide, contacting solid adsorbent with portion of charging stock in liquid phase to dissolve adsorbed hydrogen halide in liquid portion of charging stock. No. 2,408,950. Herman Pines and Herman Bloch to Universal Oil Products Co.

Logging oil and gas wells that are drilled with aid of circulating drilling fluid in order to determine light hydrocarbon content of drilling mud emerging from well indicative of nature of formation penetrated regardless of variations during drilling in properties of mud causing variations in its ability to retain hydrocarbons. No. 2,408,964. William Winn and Patrick Dougherty to Sun Oil Co.

Logging oil wells comprises treating drilling mud delivered from well to separate therefrom drilling fluid and cuttings, mixing cuttings with gaseous carbon dioxide at superatmospheric pressure to cause carbon dioxide to permeate cuttings, lowering pressure on cuttings to remove carbon dioxide and any hydrocarbons admixed therewith, subjecting mixture to treatment including analysis to determine amount of hydrocarbons. No. 2,408,965. William Winn and Patrick Dougherty to Sun Oil Co.

Deoiling wax comprises continuously supplying flowable stream of wax-oil slurry under pressure to filtering surface, propelling slurry along filtering surface in confined channel while progressively filtering oil therefrom to separate semi-solid wax, while progressively compacting separated wax to form seal of deoiled wax at end of channel, continuously removing deoiled wax from seal at rate equal to rate of formation. No. 2,408,977. Adam Gebauer to Tide Water Associated Oil Co.

Treatment of hydrocarbon material to effect change in carbon-hydrogen ratio thereof, comprises contacting hydrocarbon material at 200° to 600° C. with granular catalyst prepared by subjecting granular non-powdery crystalline ammonium-containing salt of chromic acid, to controlled heating. No. 2,408,987. Maryan Matuszak and Glen Morey to Phillips Petroleum Co.

Changing carbon-hydrogen ratio of hydrocarbon oils comprises subjecting hydrocarbons to elevated temperature to cause desired reaction in presence of catalyst for reaction period in which catalyst becomes coated with carbonaceous deposit, subjecting used catalyst to regeneration treatment in which carbonaceous deposit is removed at temeprature not more than 100° C. higher than reaction temperature, repeating cycle until catalyst becomes spent, rejuvenating catalyst by heating to 700° C. and 900° C. No. 2,408,996. Robert Parker, Jr. and Hal Huffman to Union Oil Co. of California.

Treating salt-bearing crude oil comprising steps of heating oil, adding water to heated oil and agitating to form intimate admixture of oil and water and to dissolve the salt from the oil into the water, etc. No. 2,409,005. William Webber to Standard Oil Development Co.

Solvent extraction of mineral oils including steps of mixing oil with solvent mixture comprising hydrogenated selected fraction of commercial pyridine, anti-solvent, and water. No. 2,409,059. James Montgomery, L. Barrett Goodson, and Robert Henry to Phillips Petroleum Co.

Synthesis of valuable hydrocarbon products by alkylation of isoparaffins with ethylene. No. 2,409,090. Robert Woodward and Wendell Hawthorne and Jacob Meadow to Socony-Vacuum Oil Co., Inc.

Revivification of solid contacting material contaminated with adsorbed hydrocarbon matter from decolorization of oils comprises dispersing solid contacting material in stream of air, introducing stream of air and solid contacting material into up-flow burning zone, continuously settling out portion of solid contacting material, etc. No. 2,409,234. Maurice Arveson to Standard Oil Co.

Continuous cyclic process for catalytically forming normally liquid compounds from carbon and hydrogen by action of solid hydrogenating catalyst containing carbide-forming metal. No. 2,409,235. Harold Atwell to The Texas Co.

Thermal process for producing conjugated dienes boiling below 43° C. in which petroleum hydrocarbon fractions are cracked at 650° C. to 1100° C. and partial pressures of at least atmospheric, whereby both the desired dienes and their dimers are produced, etc. No. 2,409,259. Thomas Doumani and Roland Deery, by judicial change of name to Roland Deering, to Union Oil Co. of California.

Producing isobutane comprises reacting saturated hydrocarbon with aluminum chloride in presence of hydrogen chloride under conditions for producing liquid aluminum chloride hydrocarbon complex having hydrocarbon content within range of 16% to 40% by weight based on total complex, continuously contacting charging stock consisting chiefly of normal butane and free from olefins with said complex in presence of hydrogen halide activator under conversion conditions, etc. No. 2,409,260. Edmond d'Ouville and Bernard Evering to Standard Oil Co.

Catalytically cracking hydrocarbon oil heavier than gasoline and simultaneously treating gasoline fractions with cracking catalyst to improve quality. No. 2,409,353. Chester Giuliani and Charles Angell to Universal Oil Products Co.

Removing organic fluorine from hydrocarbon materials comprises treating hydrocarbon materials with solid contact material comprising metal oxide catalytically active for hydrogenation and dehydrogenation reactions and containing silica as impurity, in presence of added ammonia under conditions producing hydrocarbon effluent of reduced fluorine content and free from silicon compounds. No. 2,409,372. Maryan Matuszak to Phillips Petroleum Co.

Treating hydrocarbon oil cracked stock containing olefins, naphthenes and paraffins, boiling within gasoline range, to produce separately aromatic compounds and gasoline of substantially higher knock rating than cracked stock. No. 2,409,382. Edward Peck to Standard Catalytic Co.

Separation of cycloparaffins from hydrocarbon mixture comprising isomerizable cycloparaffin having at least six carbon atoms to molecule and containing at least five carbon atoms in ring in admixture with open chain paraffins having same boiling range while simultaneously isomerizing cycloparaffin. No. 2,409,390. William Ross and Philip Pezzaglia to Shell Development Co.

Continuous alkylation of isobutane with ethylene in presence of aluminum chloride alkylation catalyst. No. 2,409,544. Louis Clarke to The Texas Co.

Transforming hydrocarbons into other hydrocarbons relatively poorer in hydrogen, consists in bringing hydrocarbon to be transformed in state of vapor unmixed with reactive oxygen, into contact with mixture of molybdenum oxide, chromium oxide, and ferric oxide and vanadium pentoxide, etc. No. 2,409,587. Alexander Ramage to Albert Maxwell, as trustee.

*Photographic

Treating exposed photographic element comprises immersing element including layer of polyvinyl resin which contains silver salt and which is not readily permeable to processing baths, in processing bath which contains inorganic thiocyanate and ethanolamine. No. 2,409,107. John Crabtree and George Eaton to Eastman Kodak Co.

Photographic element comprising rigid, opaque, non-frangible support, layer of luminescent material thereon which emits green light when subjected to X-rays and photographically sensitive layer insensitive to green light over luminescent layer. No. 2,409,162. Cyril Staud to Eastman Kodak Co.

Composite transfer sheet comprising bottom base sheet of paper, sheet of ethyl cellulose coated on upper face of base sheet, photosensitive layer on upper face of sheet of ethyl cellulose, top layer of vinyl resin. No. 2,409,564. William Heinecke and Frieda Heinecke to The Di-Noc Manufacturing Co.

*Polymers

Window screen comprising open mesh fabric of threads of heavy denier selected from stretched organic acid ester of cellulose yarns and stretched and saponified organic acid ester of cellulose yarns, carrying coating of water-resistant derivative of cellulose. No. 2,407,632. Camille Dreyfus.

Plasticized composition comprising plasticizable organic substance and as plasticizer carboxylic acid ester of compound selected from indene halohydrines and alkyl indene halohydrines. No. 2,407,689. Frank Soday to The United Gas Improvement Co.

Alkyd resin comprising reaction products formed upon heating of four parts of polycarboxylic acid, one-two parts of polyhydric alcohol and one-four parts of pentane-insoluble acidic material. No. 2,407,766. John Perrine and Herbert Johnson to Sun Oil Co.

Preparation of catalysis comprising cobalt or nickel and activated carbon effective in conversion of olefinic hydrocarbons to lower boiling of linear polymers thereof, obtaining catalysts of improved uniformity of composition and catalytic activity which comprises admixing aqueous solution of nitrate of cobalt or nickel with activated carbon in closed vessel, applying heat effecting increase to 400° C., maintaining sub-atmospheric pressure. No. 2,407,813. Harry Cheney to Shell Development Co.

Preparation of catalysts comprising activated carbon and cobalt or nickel obtaining catalysts of improved uniformity of composition and catalytic activity comprises heating admixture of activated carbon and aqueous solution of nitrate of cobalt or nickel in closed vessel under progressively increasing temperature, removing volatilized material and gaseous decomposition products from the vessel, introducing water into vessel throughout heating, until part of metal nitrate has undergone decomposition. No. 2,407,814. Harry Cheney to Shell Development Co.

Polymerizing normally gaseous olefins comprises continuously passing olefins upwardly in liquid phase through column at five feet in height of catalytically active liquid aluminum chloride aliphatic hydrocarbon complex in polymerization zone, etc. No. 2,407,873. Bernard Evering, Edmond d'Ouville and Don Carmody to Standard Oil Co.

Polyvinyl acetal resin pressure molding composition having decreased tendency to stick to mold after molding, containing water-insoluble polyvinyl acetal resin, to which has been added sufficient proportion of glycolic acid to reduce tendency to stick. No. 2,407,943. George Whitehead to Monsanto Chemical Co.

Method wherein different polymerizable organic compounds are copolymerized, step of catalyzing reaction by carrying it out in presence of peroxygen compound, farric salt of inorganic acid and acid. No. 2,407,946. Edgar Britton and Walter LeFevre to The Dow Chemical Co.

Molding thick masses of cellulose ester plastic compositions wherein plastic is heated above 150° F. steps which comprise placing plastic material in mold, temperature of plastic and mold being not over 150° F., raising temperature of all portions of plastic above 150° F., by raising temperature of mold. No. 2,407,962. Howard Nason to Monsanto Chemical Co

Toggle system for injection molding machines. No. 2,407,978. Thomas Eyles to Fosgood Corp.

Preparing improved polymerization products comprising polymerizing at —50° C. to —150° C. mixture containing 70 to 99 parts of isobutylene and 30 to 1 parts of conjugated diolefin of 4 to 8 carbon atoms per molecule in presence of catalyst solution of aluminum chloride dissolved in inert solvent liquid at reaction temperature, etc. No. 2,408,007. Robert Thomas and Donald Field to Jasco, Inc.

Plastic molding composition comprising reaction product of 70 to 75 parts starch and 25 to 30 parts melamine-formaldehyde condensation product. No. 2,408,065. Donald Hansen to A. E. Staley Manufacturing Co.

Forming plastic product on mold comprises superposing on mold waxed sheet, superposing on sheet a sheet of absorbent material, applying plastic to exposed surface of last-mentioned sheet. No. 2,408,245. Zachary Walter.

Adhesive, waterproof composition characterized by high fluidity at 20° F. above its softening point, heat stability at 10° F. below its softening point, chemical inertness, non-corrosiveness, flexibility at 0° F., comprising 73 to 95% normally solid asphalt, 2 to 15% cetyl acetamide wax, 3 to 12% polyisobutylene having molecular weight 500-2500. No. 2,408,297. Richard Cubberley and Frank Yeager to The Patent & Licensing Corp.

Manufacture of water soluble resins consists of condensing boric acid and amino compound of general formula described in patent. No. 2,408,332. Willard Morgan to Arnold, Hoffman & Co., Inc.

Heating 100 parts by weight of cresol and 70 parts by weight of 30% formaldehyde to cause reaction of all formaldehyde present, distilling off water and uncombined cresol, adding approximately 800 parts by weight of fused rosin, heating mixture in closed vessel until clear homogeneous resin free from cresol odor formed, driving off volatile substances while adding to mixture 100 parts by weight of glycerol together with waterfree pigment previously treated with dispersing agent, continuing heating mixture at 500° F. No. 2,408,353. Harry Toulmin, Jr. to Chemical Developments Corp.

Normally flexible plasticized polyvinyl alcohol composition containing as thermostabilizing agent substance selected from chlorides of aluminum and tin. No. 2,408,377. Charles Dangelmajer to Resistoflex Corp.

In plastic extrusion apparatus for forming composite elongate article, extrusion nozzle, means for supplying nozzle with plastic material under pressure, passageway beyond nozzle, combined cutoff gate and charging device for insert elements arranged for movement crosswise of passage, gate periodically to interrupt flow of plastic material, etc. No. 2,408,398. Theodore Johnson.

Copolymer of trichloroethylene and methyl methacrylate containing 13.8% trichloroethylene and 86.2% methyl methacrylate. No. 2,408,402. Harold Arnold to E. I. du Pont de Nemours & Co.

* *Continued from Vol. 590, Nos. 3, 4, Vol. 591, Nos. 1, 2, 3.*

Preparing modified methyl methacrylate composition comprises polymerizing dispersion of monomeric methyl methacrylate in water in presence of 0.01% to 3.0% by weight of monomer of trichlorethylene at 100° C.—150° C. under autogenous pressure. No. 2,408,426. Frederick Johnston to E. I. du Pont de Nemours & Co.

Polymeric product obtained by chlorination of copolymer of vinyl chloride and vinylidene chloride containing 10% to 95% by weight of vinyl chloride with remainder being vinylidene chloride, polymer as result of chlorination having increased percentage content of chlorine and increased resistance to darkening at elevated temperatures. No. 2,408,608. Oliver Cass to E. I. du Pont de Nemours & Co.

Polymeric product obtained by chlorination of copolymer of vinyl chloride and trichlorethylene prepared by copolymerization of monomeric mixture containing 1% to 5% by weight of trichlorethylene and remainder being vinyl chloride, polymeric product as result of chlorination, having increased percentage content of chlorine and increased resistance to darkening at elevated temperatures. No. 2,408,609. Oliver Cass to E. I. du Pont de Nemours & Co.

Granular water-soluble composition of matter comprising hydrolyzed product of reaction of mixture including furfural and mineral acid halide selected from sulfuryl chloride and phosphorus oxychloride, having particle size of less than 8 mesh. No. 2,408,615. James Dudley to American Cyanamid Co.

Method of molding articles from thermoplastic material comprises forming mold cavity between pair of plungers slidable in stationary mold body having heated section and cooling section, supplying heated thermoplastic material to cavity under pressure while latter is in heated section, etc. No. 2,408,629. Lee Green.

Molding apparatus for producing articles from thermosetting material comprising stationary mold body having heated and cooled sections and bore extending through sections, pair of opposed plungers slidable in bore and their adjacent ends having die elements thereon, etc. No. 2,408,630. Lee Green.

Making composite product comprising polyvinyl alcohol composition and fibrous material in adhering relationship comprises steps of treating fibrous material with linear ethylene amine having formula described in patent. No. 2,408,682. Charles Porter to Resistoflex Corp.

Polymerizing polymerizable vinyl aromatic compound, comprises dissolving in vinyl aromatic compound prior to complete polymerization minor amount of sodium oleyl sulfate and oleyl alcohol, polymerizing solution in mold to form solid polymer. No. 2,408,690. Raymond Seymour to Monsanto Chemical Co.

Brush comprising tapered synthetic bristles of plastic having surfaces roughened by means of comminuted fibrous filler embedded in plastic. No. 2,408,718. Elmer Haux to Pittsburgh Plate Glass Co.

In machine, combination of means for intermittently advancing body of plastic material, means for pressing material into slab of predetermined thickness, knife comprising straight blade and angular blade element attached, etc. No. 2,408,729. Jesse Brackett.

Industrial product comprising solution of chloride of polyvinyl in cyclopentanone or methyl-cyclopentanone. No. 2,408,769. Maurice Fluchaire.

Plastic molding machine comprising base, abutment mounted at one end of base, flange rigid with base spaced from abutment, horizontal tie rods extending from abutment to flange, die block holder mounted on tie rods adjacent to flange, die block holder slidably mounted on tie rods between aforesaid holder and abutment, horizontally movable hydraulically operated member mounted in abutment, etc. No. 2,408,911. Arthur Burry to Cyril Fuller.

Spinner for rotatable insertion into mold for shaping plastic material to form smoothly finished ware. No. 2,409,096. William Baird and William Sparks.

Synthetic nitrogenous resins and intermediates therefor. No. 2,409,126. William Kenyon and Delbert Reynolds to Eastman Kodak Co.

Apparatus for compression molding a threaded article including sectional mold, rotatable, threaded mold core, means for clamping sections of mold together to close mold, means for moving mold, motor for rotating core, current supply for motor, magnetic switch for controlling energization of motor, etc. No. 2,409,142. Clarence McCoy to Western Electric Co., Inc.

Polymerizing olefinic hydrocarbons, comprises reacting outside said zone, anhydrous hydrofluoric acid with phosphorous pentoxide, to yield reaction mixture; contacting olefinic hydrocarbons with reaction mixture, in reaction zone under polymerizing conditions. No. 2,409,247. John Brooks and Arlie O'Kelly and Robert Work to Socony-Vacuum Oil Co., Inc.

Polymerizing olefinic hydrocarbons, comprises contacting olefinic hydrocarbons with polymerization catalytic material selected from monofluophosphoric acid and difluophosphoric acid. No. 2,409,248. John Brooks, Arlie O'Kelly and Robert Work to Socony-Vacuum Oil Co., Inc.

Composition of matter comprising polymerized 2-chlor butadiene and plasticizer therefor selected from hydrocarbon ethers of anacardic material and heat thickened products of ethers. No. 2,409,277. Mortimer Harvey to The Harvel Corp.

Coupling comprising tube element of plastic material. No. 2,409,283. James Hudson.

Composition of matter, terpenic resinous acid ester of pentaerythritol-glycerine ether-alcohol. No. 2,409,332. Howard Woodruff.

Process for obtaining synthetic protein fibers, steps of extruding aqueous alkaline solution of water-insoluble globular protein selected from phospho-proteins, prolamines and vegetable globulins, said solution containing 10% to 30% by weight of protein, having pH of at least 9, into aqueous coagulating bath containing 0.5% by weight of formaldehyde, 0.5% to 10% by weight of acid selected from strong mineral acids and admixtures of said acids, and at least 10% by weight of salt material selected from water-soluble inorganic salts and admixtures of said salts, etc. No. 2,409,475. Edward Cline to E. I. du Pont de Nemours & Co.

In combination with brush back of polymerized synthetic plastic material and having bore therein and bristle tuft within bore, of anchor formed of copolymer of vinyl chloride and vinyl acetate having ends laterally expanded to be embedded in walls of bore and bonded to brush back. No. 2,409,490. Conrad Jobst to The Toledo Automatic Brush Machine Co.

Extrusion of vinylidene chloride polymer, step of introducing into and mixing with polymer feed to extrusion zone at atmospheric pressure, vapor of chlorinated lower aliphatic hydrocarbon volatile at temperatures in extrusion zone, in small amounts. No. 2,409,521. Ralph Wiley to The Dow Chemical Co.

Composition comprising polyvinyl acetal resin and partial ester of polyhydric alcohol and saturated monocarboxylic aliphatic acid containing more than 9 but less than 21 carbon atoms, polyhydric alcohol residue containing two unreacted hydroxyl groups. No. 2,409,548. Max Debacher to Monsanto Chemical Co.

*Processes and Methods

Converting fluid reactants in presence of mass of subdivided solid contact material comprises directing solid contact material downwardly in series from uppermost separating zone through separate confined reaction and regenerating zones, maintaining relatively compact bed of solid particles in each of zones and maintaining downwardly moving solid particles in form of continuous relatively compact column, etc. No. 2,407,700. Lyman Huff to Universal Oil Products Co.

Treatment of mixture of liquid phases comprising lightest liquid phase, heaviest liquid phase and liquid phase of intermediate specific gravity present in minor proportion, process comprising subjecting mixture to centrifugal sedimentation, continuously discharging lightest liquid phase from zone of centrifugal sedimentation, continuously discharging heaviest liquid phase from zone of centrifugal sedimentation through space interconnecting centrifugal sedimentation zone with liquid balancing zone of heaviest liquid phase, etc. No. 2,407,834. Leo Jones to The Sharples Corp.

Fractional distillation of liquid polymerizable organic compound in fractionation zone wherein compound is subjected to conditions favorable to oxidation improvement comprises introducing into fractionation zone oxidation inhibitor non-volatile under conditions of distillation in amount sufficient to inhibit oxidation and polymerization of compound in liquid state, and introducing into fractionation zone second oxidation inhibitor more volatile than organic compound to inhibit oxidation and polymerization of compound in vapor state. No. 2,407,861. I. Louis Wolk to Phillips Petroleum Co.

Developing colored smoke screen comprising suspending solid inert pigment particles which maintain predetermined pigment properties at temperatures between 500° and 800° F. in volatile liquid capable of ready gasification on application of heat with no residue, pigment particles being insoluble in volatile liquid, etc. No. 2,408,429. Harold Levey to Alonzo Patterson.

Separating constituents of atmosphere air in liquefaction apparatus by liquefaction and rectification comprises compressing nitrogen to high pressure, liquefying nitrogen, compressing air to pressure not in excess of that required to overcome resistance to travel of air through apparatus without abrupt change in pressure, subjecting air to indirect heat exchange with liquid nitrogen to separate liquid fractions enriched in oxygen and nitrogen, rectifying two fractions to recover pure liquid oxygen. No. 2,408,710. Claude Van Nuys to Air Reduction Co., Inc.

Continuously determining sugar in solution, comprises providing confined body of liquid reagent, which is slightly miscible with solution, reagent responsive in presence of sugar to color solution, maintaining on body of reagent layer of solution to be tested, continuously injecting stream of solution through body of superposed solution and partially into body of reagent to mix at interface only, withdrawing continuous flow of resulting mixture, measuring color of mixture in terms of sugar content. No. 2,408,900. Paul Alston and Erwin Morse.

Azeotropic distillation of aliphatic hydrocarbons having the formulas CNH_2N and CNH_2N-_2 from hydrocarbon mixtures comprising same. No. 2,408,947. Howard Nutting and Lee Horsley to the Dow Chemical Co.

Method of retractively expanding tubes into tube seats in wall of pressure part. No. 2,409,219. Carl Maxwell to The Babcock & Wilcox Co.

Method and means for controlling cooling of convective fluid streams. No. 2,409,376. Lev Mekler to Universal Oil Products Co.

Conducting catalytic vaporphase conversions wherein two separate and different solid catalysts are employed. No. 2,409,476. George Creelman and John Crowther to The M. W. Kellogg Co.

Separating solids from gas includes creating enclosed gas stream, deflecting portion of stream against free surface of liquid body and passing stream through and in contact with flowing layer of liquid in path divergent to direction of flow of layer. No. 2,409,558. Robert Gunn to Aluminum Co. of America.

In contacting apparatus, means defining substantially vertical chamber, plurality of substantially horizontal deflectors each comprising means defining inverted trough, deflectors arranged in plurality of parallel vertical series, means to admit fluid to under side of deflectors of alternate series and means to withdraw fluid from under deflectors of each other series, vertical distance between successively lower deflectors of each series being progressively greater. No. 2,409,596. Thomas Simpson, John Payne and Louis Evans to Socony-Vacuum Oil Co., Inc.

*Rubber

Tacky rubber-like composition comprising from 75 to 95 per cent by weight of non-tacky rubber-like copolymer and from 5 to 25 per cent of tacky, cyclohexanone-soluble co-polymer. No. 2,407,953. Robert Dreisbach, Edgar Britton and Walter Le Fevre to The Dow Chemical Co.

Preparing synthetic rubberlike materials, comprises passing stream of coagulant and stream of latex obtained by polymerization of diolefin in aqueous emulsion, latex containing some low-boiling unpolymerized diolefin, into coagulation zone at low linear speed, agitating latex and coagulant, etc. No. 2,408,128. Walter Squires, Jr. and Paul Parker to Standard Oil Development Co.

Reclaiming rubber from vulcanized rubber scrap, comprises subjecting quantity of pieces of scrap material in dry form to intense mechanical action in heated internal mixer, in presence of oxygen amounting to fraction of one per cent by weight of scrap material, for ten to thirty minutes until temperature rises, to 190° C. to 250° C., discharging rubber, quenching same at same moment. No. 2,408,296. Frank Cotton and Percy Gibbons; said Gibbons to said Cotton.

Treating finely divided hydrogen-containing carbon black with gaseous halogen for time and at temperature sufficient to leave more than 1% hydrogen halide adsorbed on black. No. 2,408,696. Hugh Smallwood to United States Rubber Co.

Producing improved rubber from guayule rubber worms, comprising suspending worms in water, inoculating mixture with Pseudomonas boreopolis organisms, conditioning medium for growth of organisms, allowing organisms to grow until resin content of worms is decreased, whereby physical properties of rubber will be improved, removing and washing improved rubber and drying it. No. 2,408,853. Samuel Hoover, Pul Allen and Joseph Naghski to the Secretary of Agriculture of the United States of America.

Annular fluid seal comprising body of rubber-like material having central

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tubular part, annular diaphragm-like flange portions extending radially outwardly from each end of tubular part, flange portions flexing axially toward and away from each other pivoting on tubular part in compression and expansion of seal, etc. No. 2,408,909. Olin Brummer.

In gasoline container characterized by ability to self-seal when in contact with gasoline after passage of bullet therethrough, wall having layer of rubber-impregnated rayon, layer of latex, layer of vulcanized rubber, another layer of latex and inner layer comprising plasticized sheet of polyvinyl formal resin. No. 2,409,252. Thomas Carswell to Monsanto Chemical Co.

Softening rubber-like chloroprene polymer comprises mixing polymer with minor proportion of its weight of salt of dialkyldithiophosphoric acid and salt-forming organic base selected from aliphatic secondary amines, mononuclear aromatic primary amines, cycloaliphatic amines, piperidine, guanidine, mono- and di- mononuclear aryl guanidines, biguanide, the mono- mononuclear aryl biguanidies, guanylthiourea and isothiourea. No. 2,409,344. Arnold Davis to American Cyanamid Co.

Separating metal from soft vulcanized rubber vulcanized thereto comprises weakening rubber-to-metal bond by exposing metal-rubber object to gaseous mixture of steam and vapor of rubber softening oil at 300-425° F. for 16 hours. No. 2,409,402. Harry Thompson and Derwin Moore to Wingfoot Corp.

Rubber compounding material comprising friable resin made by heating together, with ingredients in fused condition mixture of petroleum pitch polymer that has softening point above 200° F. and contains vanadium pentoxide, in excess of 0.20%, and bituminous hydrocarbon mixture that is compatible with rubber, and melts below 70° F. No. 2,409,437. Clifford La Crosse.

Apparatus for treating unvulcanized rubberlike tread material to effect union of splice throughout depth of splice. No. 2,409,571. Charles Leguillon to The B. F. Goodrich Co.

*Specialties

Preparation useful in laundering, comprising gum tragacanth, glycerine, sodium borate, emulsified solution. No. 2,407,635. Herman Engler to Paul Koletzko and C. Alfred Hands.

Making coherent and coalescent bar of normally non-liquid synthetic organic non-soap detergent compound having surface active properties. No. 2,407,647. John Bodman to Lever Brothers Co.

Fire resistant coating composition. comprising polymeric material from n-butyl methacrylate polymers and ethyl, methyl, and propyl ester polymers of acrylic and methacrylic acids. No. 2,407,668. Martin Leatherman.

Composition for removing oil, grease, metal oxide from and depositing metallic phosphate coating on metal comprises solution of water, phosphoric acid, aromatic petroleum solvent, coupling agent comprising, by weight, 25-33% butanol, 21-29% ethanol. No. 2,408,155. Sydney Thornbury to Turco Products, Inc.

Insecticidal dust composition comprising acetophenone semicarbazone in form of impalpable powder admixed with solid diluent. No. 2,408,307. Samuel Gertler and Herbert Haller to the Secretary of Agriculture of the United tSates of America.

Drill lubricant composition comprising weight basis, 45 to 52% soda base grease, 38 to 43% paraffin wax having melting point of at least 143° F., 8 to 12% turpentine, 0.25 to 0.5% aluminum stearate. No. 2,408,385. Edmond Flood to Consolidated Vultee Aircraft Corp.

Insect repellent composition comprising N,N-diethyl-benzamide incorporated in carrier selected from dusting powder and suitable non-toxic solvent. No. 2,408,389. Samuel Gertler to the Secretary of Agriculture of the United States of America.

Tanning hides or skins comprises treating with aqueous solution containing iron salt, substance selected from salts of hydroxy mono and polycarboxylic acids and polycarboxylic acids having at least one double linkage, and substance selected from salts of amidines of higher fatty acids and derivatives of such amidines in which at least hydrogen atom attached to nitrogen is replaced by aliphatic radical. No. 2,408,417. William Ellenbogen.

Pickling stainless steels comprises immersing in aqueous acid reacting non-electrolytic pickling bath comprising water, mineral acid and active pickling agents consisting of ferric sulfate and alkali fluoride. No. 2,408,424. John Healy, Jr., Maurice Taylor, and Furio Abbiati to Monsanto Chemical Co.

Apparatus for cooling and hardening wax carbon coatings. No. 2,408,498. Nelson Welk to The McBee Co.

Destroying or reducing foam, by subjecting foaming composition to action of reagent comprising basic acylated polyaminoalcohol. No. 2,408,527. Louis Monson to Petrolite Corp., Ltd.

Liquid spray device for airplanes comprising jettisonable storage tank for liquid to be dispersed, adapted to be mounted on airplane, internally positioned vent tube opening at one end to atmosphere through wall of tank whereby positive pressure is produced for discharging contents of tank, etc. No. 2,408,774. Rupert Goddard and Fleming Weaver.

Treating oleaginous material containing gum guaiac and normally tending to become discolored in presence of metals, comprises incorporating in oleaginous material acid reacting material stronger than acetic acid in amount whereby such discoloration is retarded. No. 2,408,904. Howard Black to Industrial Patents Corp.

Polishing member comprising fibrous body, abrasive particles adhered thereto, adhesive for particles containing finely ground asbestos and clay in relation to solid content. No. 2,408,946. Harold Nelson.

Slushing oil composition consisting of petroleum fraction to which is added degras, a metal salt of oil-soluble sulfonic acids derived from petroleum by treating petroleum stocks with concentrated sulfuric acid and from 1 to 10% of a compound having formula R—O—alkylene—O—R'. No. 2,408,972. Arthur Eberhart to Westinghouse Electric Corp.

Wood preservative composition characterized in that it contains arsenic compound selected from arsenic acid and alkali metal arsenates, fluorine compound selected from hydrofluoric acid and alkali metal fluorides, chromium compound selected from chromic acid, alkali metal bichromates and alkali metal chromates, and at least one water-soluble salt of at least one of the metals selected from Ca, Mg, Zn and Al. No. 2,408,978. Bror Hager to Bolidens Gruvaktiebolag.

Composition of matter usable as hydraulic fluid comprising major proportion of high boiling isoparaffinic hydrocarbons boiling between 400 and 700° F. blended with small amount to change viscosity index thereof, of polymer of low boiling olefin having molecular weight above 5000 and polymerized acrylic acid ester of saturated alcohol. No. 2,408,983. Myron Kollen to Union Oil Co., of California.

Motor fuel comprising 80 to 95% of branched alkanol of 3 to 5 carbon atoms and minor proportion sufficient to raise Reid vapor pressure of blend to 5 lbs. per square inch at 100° F. of normally gaseous hydrocarbon of 3 to 5 carbon atoms selected from aliphatic and cycloaliphatic hydrocarbons. No. 2,408,999. Anthony Robertson to Standard Oil Development Co.

Inhibiting development of rancidity and discoloration in granular soap product prepared from fat formula containing minor proportion of rosin, comprises incorporating with soap a polyethylene polyamine. No. 2,409,056. Herbert McClain to The Procter & Gamble Co.

Pyrotechnic composition to produce colored smoke, comprising volatile colored organic compound and cool guanidine explosive. No. 2,409,111. Tenney Davis to National Fireworks, Inc.

Improved method of operating aviation gasoline engine requiring fuel having octane number of about 100, consists of supplying to engine as fuel during operating period, gasoline comprising mixture of isoparaffin hydrocarbons having five, six, seven, eight and nine carbon atoms per molecule and about 10 per cent by volume of isopropyl benzene and at least 3 ml. of tetraethyl lead fluid per gallon. No. 2,409,156. Walter Schulze and Richard Alden to Phillips Petroleum Co.

Improved method of operating aviation gasoline engine requiring a fuel having an octane number of about 100, consists of supplying to engine as fuel during operating period gasoline comprising mixture of isoparaffin hydrocarbons having five, six, seven, eight and nine carbon atoms per molecule and between 2 and 7% by volume of mono-butylbenzene other than normal butyl-benzene and at least 3ml. of tetraethyl lead fluid per gallon. No. 2,409,157. Walter Schulze and Richard Alden to Phillips Petroleum Co.

Motor fuel comprising hydrocarbon base fuel having dissolved therein minor amount of organo-metallic anti-knock agent comprising product obtained by heating under pressure unsaturated hydrocarbon and carbonyl of metal of atomic number 26 to 28. No. 2,409,167. Preston Veltman to Texaco Development Corp.

Motor fuel comprising hydrocarbon mixture stable against gum formation, composed of saturated aliphatic hydrocarbons and containing small amount of lead alkyl anti-knock agent which in presence of hydrocarbons tends during storage to form lead-containing precipitates and hydroxy aromatic hydrocarbon of class consisting of hydroquinone and quinhydrone in amount to inhibit formation of lead-containing precipitate during storage. No. 2,409,171. Paul De Verter to Standard Oil Development Co.

Smoke-producing mixture comprising major proportion by weight of reactive metal chloride, oxide of metal higher in electromotive series than metal constituent of chloride and finely divided metal higher in electromotive series than the metal constituent of the oxide. No. 2,409,201. Leo Finkelstein and Hervey Elkins.

Insulating covering comprising plurality of plies of corrugated paper, with each ply including corrugations of different widths, etc. No. 2,409,249. George Brown to Johns-Manville Corp.

Asphalt adhesive. No. 2,409,258. Lewis Davis and Armand Gauthier to McLaurin-Jones Co.

Heating together from one part to ten parts by weight of blow terpenic product with one part of polyvinyl ester to form gel when cold. No. 2,409,276. Mortimer Harvey to Harvel Research Corp.

Lubricant comprising hydrocarbon oil and less than 5% by weight, of oil-soluble sulfurized derivative of partially hydrogenated cardanol. No. 2,409,296. Rush McCleary to The Texas Co.

Lubricating composition comprising mineral lubricating oil having incorporated therein 0.1-5.0% by weight of oil-soluble metal derivative of compound of formula described in patent. No. 2,409,303. John Morris and Rush McCleary to The Texas Co.

Bag with insoluble automatic fold closing. No. 2,409,314. Adolf Rambold.

Chemically resistant lubricant having following composition, mineral white oil, petrolatum (light-oil-free), paraffin wax, and amount of viscosity-increasing linear polymer of oxygen-containing aliphatic compound. No. 2,409,333. Donald Wright and Charles Bohmer, Jr. to Standard Oil Development Co.

Oil-in-water emulsion suitable for use in cosmetic and pharmaceutical preparations comprising 1%-65% of viscous petroleum oil, 34%-98% of water and 0.75%-10% of solids of inorganic jelly produced as aqueous effluent by centrifuging aqueous suspension of swellable clay containing 5%-10% by weight of solids at 800-1500 g. No. 2,409,338. William Alton and Francis Hutchins to R. T. Vanderbilt Co., Inc.

Liberating acid from non-titratable glycol-acid complex formed during hydration of aqueous solution of corresponding olefin oxide in presence of acid hydration catalyst that forms such complex with glycol and removing free acid from resulting glycol solution, comprises passing aqueous glycol solution through bed of anion adsorbing resin. No. 2,409,441. Floyd Metzger to U. S. Industrial Chemicals, Inc.

Lubricant for instrument bearings comprising tricresyl phosphate and ethylene glycol monobenzyl ether in equal percentages by weight. No. 2,409,443. John Morgan and Russell Lowe to Cities Service Oil Co.

Lubricant consisting of mixture of 40 to 60 percent of tricresyl phosphate, 25 to 15 percent of di butyl phthalate, and 35 to 25 percent of triethylene glycol di-2-ethylbutyrate, all percentages being by weight. No. 2,409,444. John Morgan and Russell Lowe to Cities Service Oil Co.

Securing closure to container provided on its interior surface with thermoplastic liquidproof material which comprises coating closure with thermoplastic liquid-proof material, bringing into juxtaposition coated surfaces of closure and container, applying heat and pressure to bond surfaces together by pressing surfaces and plies of container and closure between heated pressure member and resilient backing member. No. 2,409,460. Harry Waters.

Production of catalyst comprising at least major proportion of inorganic gel prepared by precipitation in aqueous solution comprises mixing inorganic catalyst gel while moist and hydrated state with starch material in amount corresponding to 30 to 60 per cent of dry weight of catalyst gel to form plastic mass, extruding plastic mass in tubular form, dividing extruded catalyst into rings, drying rings at 150 to 300° F. in atmosphere at 20 to 50 per cent relative humidity, calcining resulting dried rings. No. 2,409,494. George Keating to The Texas Co.

*Textiles

Yarn which comprises strip of paper containing quantity of water distributed throughout paper, strip being formed with random longitudinal folds twisted about its longitudinal axis, and continuous coating impenetrable by water covering outer surface of twisted strip. No. 2,407,926. Kenneth Hamilton to Mohawk Carpet Mills, Inc.

Improving dyeing properties of synthetic protein-base material formed by shaping alkali-soluble acid-coagulable protein comprising casein

* *Continued from Vol. 590, Nos. 3, 4, Vol. 591, Nos. 1, 2, 3.*

treating with formaldehyde. No. 2,408,026. Francis Atwood to National Dairy Products Corp.

Treating synthetically formed protein-base fiber produced by shaping into fiber form alkali-soluble acid-coagulable protein comprising casein and treating with formaldehyde. No. 2,408,027. Francis Atwood to National Dairy Products Corp.

Multi-unit yarn winding machine. No. 2,408,135. Louis Cotchett to Foster Machine Co.

Wire reinforced fabric comprising plurality of threads arranged in plain weave, each thread having stranded wire structure between latex coated cords. No. 2,408,368. Alan Brickman to The American Steel & Wire Co. of New Jersey.

Production of voluminous, permanently crimped artificial staple fibers, comprises immersing relaxed, unstretched and unassociated dry-spun staple fibers, having basis of organic derivative of cellulose and prepared from filaments spun without tension being exerted thereon, in aqueous liquid medium containing water-soluble swelling agent having softening action on organic derivative of cellulose, removing excess liquid from staple fibers, immersing staple fibers in water at 150 to 160° F., removing water. No. 2,408,381. Frederick Dodge to Celanese Corp. of America.

Machine for impregnating fabric strip with dry powder comprises, container, means for conducting strip of fabric in yieldable contact with upper surface of mass of powder in container, scraper means for removing excess powder from surface of strip of fabric, means for forming loose roll of powder impregated strip of fabric. No. 2,408,577. Jack Pava, one-half to Douglas Pincock.

Extrusion device for simultaneously forming plurality of filaments comprising supply duct, spinneret to receive filament-forming material from duct having plurality of rows of orifices disposed generally throughout area considerably larger than cross-section of duct, means comprising rigid member having plurality of apertures each larger than any one of spinneret orifices, facing orificed area of spinneret and disposed over area co-extensive with that occupied by rows of orifices, etc. No. 2,408,713. Wesley Webb to American Viscose Corp.

Circular loom. No. 2,408,732. Constantine Caldes.

Manufacturing pile fabric of extensive area from assembled smaller pieces consists in fray proofing fabric by embedding tufts of pile loops in thermoplastic adhesive having softening point of between 85° C. and 140° C. and composed of vinyl resin, etc. No. 2,408,756. James Dow and Ara Dildilian to Bigelow-Sanford Carpet Co., Inc.

Production of alkali-resistant fabrics from alginic materials, comprising producing alginate rayon of alkali soluble type, manufacturing fabric therefrom and converting alkali soluble alginate of fabric to alkali-resistant alginic material. No. 2,409,319. John Speakman and Norman Chamberlain to Cefoil, Ltd.

Light-weight fabric from which parachute canopies may be made. No. 2,409,370. Frank Manson and James Maskey.

Apparatus for shrinking textile fabrics. No. 2,409,543. Franklin Chatfield to Munsingwear, Inc.

Agricultural

Ovicidal composition for application to living trees including dormant spray oil and as active toxicant compound having formula described in patent. No. 2,410,281. Fred Fletcher and Eugene Kenaga to The Dow Chemical Co.

Insecticidal and insectifugal composition containing as essential active ingredient an aryldithiobiuret and carrier therefor. No. 2,410,862. Euclid Bousquet and Hubert Guy to E. I. du Pont de Nemours & Co.

Ceramics

Heat cast refractory consisting of zirconia, magnesia, alumina and silica in which zirconia is not less than 15% and silica is not less than 11% and mols of magnesia are equal to mols of alumina plus twice mols of silica. No. 2,409,844. Theodore Field to Corhart Refractories Co.

Apparatus for producing potteryware, comprising support for carrying molds through fabricating zone, means for forming ware on molds, mold conveyor formed for depositing empty molds directly on support and removing loaded molds. No. 2,409,999. William Miller to Miller Pottery Engineering Co.

Mold for casting appendage on prefabricated potteryware. No. 2,410,123. William Miller and Ashley Reek to Miller Pottery Engineering Co.

Reducing power factor of borosilicate glass consisting of about 70% SiO_2, 26% to 27.5% B_2O_3, 2.5% to 4% alkali metal oxide and fluorine, includes step of introducing boron content of glass as crystalline boric oxide. No. 2,410,286. Harrison Hood to Corning Glass Works.

In production of refractory furnace linings and brick therefor method comprises mixing with mass of magnesia-containing particles dilute sulphuric acid as gauging liquid and substantially water-insoluble sulphate and moulding, pressing mixture into form. No. 2,410,359. John Perry and Alan Prince to Canadian Refractories, Ltd.

In glass making machinery provided with table disposed to be indexed forward, in combination, block mold having cavity for receiving gob of glass and opening leading from cavity, mold carried by table, valve to close mold opening cooperative in presenting continuous cavity face for molding, etc. No. 2,410,422. George Breene and Louis Garratt.

In glass molding machine, combination with base, of cooperating molds mounted thereon, at least one mold being movable to and from position in which molds define shape of material to be molded, chamber enclosing molds and having opening therein through which material to be molded may be passed to and from molds, etc. No. 2,410,616. Julian Webb to Eastman Kodak Co.

In product formed from molten glass tubing, plurality of hollow pillow-shaped elements joined together by full surface fusion of contiguous mated edges and sealed apart by these surfaces of joinder, pillows having flat side surfaces and flattened edges. No. 2,410,744. Milton Powers.

Homogenizing glass comprises melting glass mass, simultaneously withdrawing contiguous portions of mass in adjacent separate streams, interspersing adjacent streams and uniting them to form second glass mass in which some contiguous portions were non-contiguous portions in first-named glass mass. No. 2,411,031. Alden Deyrup to E. I. du Pont de Nemours & Co.

Coatings

Metal protective, pigmented coating composition comprising at least 10% by weight, based on total pigment present, of calcium chromate and vehicle therefor, selected from alkyd resin and phenol/formaldehyde resin, and having water-impermeability value of at least 5 at film thickness of 0.005 inch after 6 months' outdoor exposure. No. 2,410,187. Clifford Sloan and Gordon Patterson to E. I. du Pont de Nemours & Co.

Composition adapted for application as film-forming material for protective purposes comprising oleo-resinous film-forming material having incorporated therein reaction product of acid having degree of dissociation sufficiently high so that upon mixing same with higher fatty acid reaction takes place between two acids without application of heat, etc. No. 2,410,688. Carl Shapiro to Lynnwood Laboratories, Inc.

Dyestuffs

Pyrrole dyes having general formula described in patent. No. 2,409,612. Leslie Brooker and Robert Sprague to Eastman Kodak Co.

Method of coupling azo compound with methylenic coupling component to provide pigment of clean color and high tinctorial strength. No. 2,410,219. Theodore Langstroth to Sun Chemical Corp.

Manufacture of copper phthalo-cyanine dyestuffs. No. 2,410,301. Grady O'Neal to The Sherwin-Williams Co.

Dyeing machine comprising case for containing row of vats and having hinged cover including material guide means projecting through elongated slot in cover for movement from one to another of vats, improvement including slide means for supporting material guide means. No. 2,410,336. Frederick Carter and Donald Taylor.

Equipment

Extracting water from atmospheric air, comprising closed tank for containing water, means providing plurality of air flow passages extending through tank having walls of heat-conducting material, refrigerating means for cooling water in tank to temperature below dew point temperature of surrounding atmosphere, etc. No. 2,409,624. Bernard Granville.

Ventilating attachment for welders' helmets of type including horizontal and vertical head band. No. 2,409,641. Wilbur O'Quinn.

In mixing machine, combination of endless belt conveyer having upper run for supporting loose material to be mixed and for carrying material, mixing rotor disposed transversely over conveyor run for operating on material, casing over rotor, means for supporting rotor from one end having pivotal axis extending transversely of rotor axis to permit upward tilting of rotor when encountering excessive resistance to rotation. No. 2,409,646. Harry Seaman.

Valve means for controlling pressure fluid medium, combined discharge means and handle unit, means for mounting unit for movement relative to valve means, means cooperating between valve means and unit responsive to movement for operating valve means. No. 2,409,647. John Stroop to Specialties Development Corp.

Refrigerant distributing device comprising conduit closing member having unobstructed end wall with surrounding tubular flange providing circular inlet chamber, etc. No. 2,409,661. Franklyn Carter to Detroit Lubricator Co.

Furnace including tube extending vertically there-through, forming heating chamber, refractory rod extending into tube from upper end, means without tube for rigidly holding rod in fixed relation thereto, and for sealing upper end of tube, second refractory rod extending upward into tube through lower end adapted to support work and press same against upper rod, means for relatively moving furnace and second rod to separate same for insertion of work. No. 2,409,669. Harry Dietert.

In reversible fluid-operated and fluid-operating mechanism a rotor having helical projection, receptacle enclosing rotor and loosely rotatable about eccentric axis, flexible membrane coaxial with receptacle and limiting therein annular space and central chamber, inlet and outlet respectively in communication with opposite ends of chamber, body of liquid in annular space adapted to be driven in rotation by viscosity and forced by centrifugal force against inner wall of receptacle, etc. No. 2,409,688. Rene Moineau.

In filter leaf for discontinuous, stationary leaf type filters comprising frame carrying two fine mesh wire screens constituting filtering medium and coarse-mesh wire separator screen mediate the fine-mesh wire screens, etc. No. 2,409,705. Fredrick Reinhardt to Richfield Oil Corp.

Apparatus for separating liquid from solids, comprising means for feeding mixture of liquid and solids to centrifugal rotor having perforated wall and circumferential edge, means for rotating rotor to remove liquid from solids while solids pass along wall to discharge over edge. No. 2,409,713. Laurence Sharples to The Sharples Corp.

In waste ore handling conveyance, substantially U-shaped frame, supporting and maneuvering wheels thereon, toothed scooping and loading style bucket pivotally mounted between rear ends of side members of frame, drum rotatably mounted between side members, cables windable on drum and having free ends connected with end portions of bucket, further cable means for simultaneously maneuvering conveyance and controlling drum. No. 2,409,752. Percy Goodwin.

Valve for hose couplings. No. 2,409,753. John Harrison and Harold Byers.

In hydraulic selector valve, support, valve operating lever, pivot connecting end portion of lever with support for rocking movement in relation thereto, end portion of lever having head which provides two oppositely projecting extensions, one at each side of pivot, pair of flattened side arms at each side of pivot having aligned apertures through which pivot passes, elongated valve operating plate secured to edge portions of each of said pairs of flattened arms, etc. No. 2,409,765. Ottmar Kehle to Adel Precision Products Corp.

Liquid level control for body of liquid subject to diminution, comprising means for supplying stream of feed liquid to body, valve controlling flow of feed liquid through supplying means, means forming chamber immersed in body and having opening in its underside, means for supplying gas capable of absorbing moisture to chamber under sufficient pressure to continuously pass through opening and to bubble up through body, etc. No. 2,409,768. Charles Lavett and Henry Kerker to Blaw-Knox Co.

Reaction vessel comprising, in combination, vertically disposed outer shell of tubular form with relatively flat top and bottom heads, relatively flat tube sheets transversely disposed in spaced apart relation within shell and secured thereto, plurality of vertically disposed tubular members extending between and secured to tube sheets, etc. No. 2,409,780. Lev Mekler to Universal Oil Products Co.

In dehydrating apparatus, combination of pressure sealed furnace and drying chamber having elongated passageway for air and materials leading thereinto and therethrough; fuel burner for furnace, means for feeding fuel to burner and for establishing maximum rate of feed, etc. No. 2,409,787. Wilburn O'Neal and Robert Williams.

In acetylene generator, housing provided with carbide hopper and water

reservoir, measuring receptacle below hopper, communicating therewith and provided with valve seat at lower end; valve for seat, having depending stem; control rod slidably carried horizontally by housing, etc. No. 2,409,833. Willie Burch, one-half to Forrest Parrott.

Centrifugal type compressor having impeller and variable vane diffuser, and control mechanism for positioning diffuser vanes including means responsive to ratio of static pressure rise across impeller to static pressure rise across diffuser to maintain pressure ratio constant over wide operating range, etc. No. 2,409,836. Everett Coe to General Electric Co.

Centrifugal type compressor having impeller and variable vane diffuser for receiving medium discharged from impeller, motor means for varying position of diffuser, and mechanism for controlling last named means including first device responsive to static pressure rise across impeller and second device responsive to static pressure rise across the diffuser. No. 2,409,837. Joseph Alford to General Electric Co.

Pipe joint comprising two plain end pipe sections of uniform inside diameter in axial alignment, hollow sleeve comprising material rapidly disintegrable by action of liquid having beaded and thickened midportion with bead extending partway between and separating ends of pipes, etc. No. 2,409,865. Howard Jewell.

Apparatus for loading and unloading moving floor vehicles. No. 2,409,870. James Kinnaird to Bromilow and Edwards, Ltd.

In control apparatus for establishing pneumatic control pressure, in combination, responsive means continuously and proportionately responsive to value of variable, valve means for controlling supply of air to establish pressure, first pneumatic motor means mechanically connected to valve means and having relatively small ratio of effective movement to pressure change, etc. No. 2,409,871. Anker Krogh to The Brown Instrument Co.

Antisiphon ball cock valve. No. 2,409,890. Jesse Owens.

Apparatus for cooling liquid by evaporation, comprising casing having cooling chamber and discharge opening, means for creating sufficiently low pressure in chamber to cause liberation of vapor from liquid, conduit means for introducing liquid into chamber, deflector means lying across outlet end of conduit means in spaced relation therewith to cause liquid to flow through chamber in form of sheet, etc. No. 2,409,896. John Plummer, Jr., to Ingersoll-Rand Co.

In vapor compression type of refrigerating system, a combination refrigerant receiver and dehydrator unit connectable in refrigerant line of system, said unit comprising housing, air purge means on housing, means for filling housing, refrigerant dehydrating compound in housing filling major portion thereof, etc. No. 2,409,928. Martin Cahenzli, Jr., to The Harry Alter Co.

In pump for lubricant and the like, primer cylinder, primer piston movable therein, pump cylinder carried by primer piston, pump plunger carried by primer cylinder, pump cylinder movable onto and off of pump plunger, primer cylinder and pump cylinder communicating freely with each other when pump cylinder is off pump plunger, outlet check valve carried by pump cylinder, etc. No. 2,409,962. Spicer Shearman to The Aro Equipment Corp.

Apparatus for maintaining selected pump pressure differentials. No. 2,409,975. Russell Curtis to Curtis Pump Co.

In device for measuring rate of flow of liquid, in combination, supply tank in which supply of liquid is maintained, weigh tank, weighing scale for supporting weigh tank, piping from supply tank to liquid receiving system, branch pipe to weigh tank, electrically controlled normally open valve in pipe to each tank, weigh tank being filled from supply tank when both valves are open, electrical control system including interval timer, etc. No. 2,409,982. Ralph Longmate to Toledo Scale Co.

Microspray device. No. 2,409,987. Herman Schroeder and Arthur Lindquist to the Secretary of Agriculture of the United States of America.

In combination, in fluid operable motor, cylinder, main plunger reciprocably mounted therein and having fluid operable advancing area, bore in plunger, auxiliary plunger extending into bore, bore extending through auxiliary plunger, externally threaded end on plunger, etc. No. 2,410,001. Bernard Ashbaugh to H-P-M Development Corp.

Thermohydrometer comprising barrel, collapsible bulb, nozzle, bulb and nozzle being carried by and in communication with opposite ends of barrel, member having well therein for retaining liquid to be tested, and float comprising buoyant body portion and graduated stem. No. 2,410,031. Arnold Hoyer to Kimble Glass Co.

Fractionating column head, comprising chamber, condenser including closed condensing surface within chamber, condensing surface tapered at lower end at which end it has opening, capillary tube within condenser having its lower end communicating with and sealed to walls defining opening, capillary tube having upper end extending outside of condenser to connect to source of lowered pressure, means by which cooling medium may be brought into contact with condensing surface. No. 2,410,045. Robert Burk and Thomas Walsh to The Standard Oil Co.

Explosively blasting fluid-tight joint between metal fastening element provided with central axial cavity and another body provided with recess to receive metal fastening element, comprises inserting hollow portion of fastening element into recess of body, providing explosive unit at least partly within element cavity and partly within portion of element cavity which extends within body recess, etc. No. 2,410,047. Lawton Burrows and Walter Lawson to E. I. du Pont de Nemours & Co.

In refractory cracking and coking oven of broad rectangular sole-fired type, having sealable broad refractory coking oven of long rectangular type being broader than it is high and adapted to receive carbonaceous material capable of evolving upon being heated volatile vapors including straight chain hydrocarbon vapors and residue capable of being carbon-

ized and coked, main heating system located under entire sole of oven, etc. No. 2,410,074. Charles Hughes to Hughes By-Product Coke Oven Corp.

In valve assembly, combination of body provided with longitudinal bore, annular valve seat in bore, valve member coacting with seat, second annular valve seat in bore, second valve member coacting with second valve seat, reciprocatory valve stem on which both members are mounted for unitary oscillation in bore, etc. No. 2,410,105. Valentin Remus.

Batch scale. No. 2,410,138. Francis Werner.

Weighing scale. No. 2,410,139. Lawrence Williams to Toledo Scale Co.

Heating conducting means in core of liquid cooler having tubes and fins, comprising solid heat conducting member exposed to cooling medium passing over fins, heat conducting member being of relatively large cross sectional area and small surface area and carried between and bonded to certain tubes and secured contiguous with fin, said member being of higher heat conductivity than fin. No. 2,410,180. Charles Perkins to Modine Manufacturing Co.

Eye protection device comprising goggle eyecup having opening in its side wall and connecting means adjacent forward edge thereof, wall surrounding opening, having outwardly raised portion, lens retaining ring having means for connection with said connecting means and baffle plate carried by eyecup overlying opening in side wall, etc. No. 2,410,184. George Schauweker to American Optical Co.

Safety closure mechanism for sampling hole in stock dye kettle containing fluid under pressure and having cover plate with outwardly extending cylindrical wall surrounding sampling hole comprising cover for sampling hole having flange telescopically and rotatably fitting wall, etc. No. 2,410,214. Joseph Higginson and Homer Riggs to Riggs & Lombard, Inc.

Spray nozzle. No. 2,410,215. Henry Houghton.

Welders' helmet. No. 2,410,256. Marshall Anderson and Melvin Sellstrom to Sellstrom Manufacturing Co.

Centrifugal bowl the shell of which has opening therethrough the upper wall of which slopes downward in outward direction and affording seat for nozzle body, nozzle body of shape complementary to that of hole and having closed outer wall which, when positioned in hole, is flush with outer wall of bowl shell, etc. No. 2,410,313. George Strezynski to The De Laval Separator Co.

Apparatus for forming and dividing stream of gelable sol into plurality of smaller streams. No. 2,410,314. Elbert Sowerwine, Jr., to Socony-Vacuum Oil Co., Inc.

In device for dividing stream of gelable sol into plurality of smaller streams, divider of generally conical shape, means to maintain divider in position with apex thereof directed upwardly, outer surface of divider having plurality of grooves extending down the surface thereof from about apex, grooves being coated with layer of ice, etc. No. 2,410,315. Elbert Sowerwine, Jr., to Socony-Vacuum Oil Co., Inc.

Vibratory separator, comprising serrated deck of inclined plates having risers between adjacent plates, each plate being perforate adjacent its apex and imperforate adjacent root, plates characterized by being smooth from root across imperforate and perforate portions to apex, means for vibrating deck longitudinally thereof, whereby particle bearing fluid has particles therein scrubbed and stratified and portions thereof intermittently decanted. No. 2,410,326. William Ziegler and Claude Garber to The Sink & Float Corp.

Furnace for heating gaseous fluids comprising means forming elongated cylindrical furnace chamber closed at one end, gas discharge duct connected centrally into opposite end of chamber, burners disposed for introducing fuel to be burned to chamber through its wall near said one end and arranged in circle to direct fuel streams toward and tangentially to imaginary circle centered on longitudinal axis of chamber, etc. No. 2,410,337. Roland Cooper and Sven Holm to The Air Preheater Corp.

In pump combination of narrow elongated container divided to form two separate gravity filled chambers, discharge means for chambers extending upwardly through container, valve means operable to admit fluid pressure to chambers alternatively, removable closure member for top of each chamber, etc. No. 2,410,354. Joseph Meyer.

Filter element formed of filtering material folded to include alternating top and bottom sections of shape roughly triangular or wedge shaped, top sections tapering in one direction, bottom sections tapering in opposite direction, side wall sections lying between top and bottom sections having their edges joined in front and back at apexes of triangular top and bottom sections. No. 2,410,371. Cecil Vokes.

Revolving crane accessory for fork trucks. No. 2,410,373. John Westervelt, Jr., to National Fireworks, Inc.

Fluid pressure operated valve comprising, valve body having passage therethrough including high and low pressure chambers, one of chambers forming cylinder, movable body in passage including piston slidable in cylinder and including valve, one of bodies providing restricted passage leading to opposite ends of piston, etc. No. 2,410,375. Fred Wright to The Denison Engineering Co.

Hoisting device, comprising flexible chain having series of longitudinally spaced transverse elements, lever, one end of chain connected to lever, lever provided with hook engageable with any of transverse elements to retain chain in position embracing object to be hoisted with lever projecting generally radially from object, hoisting member connected to lever near outer end thereof, etc. No. 2,410,378. Oliver Gallamore to Diamond Chain & Manufacturing Co.

Heating system comprising furnace, heating element associated with furnace and operative to supply heat thereto, first and second signals associated with furnace, temperature regulator adapted to be set selectively within given range to desired furnace temperature, timer to be set selectively within given range to desired timing operation, etc. No. 2,410,384. Harold Lindsay to the Director of the Office of Scientific Research & Development, Office for Emergency Management, of the Government of the United States.

Improved viscosimeter of spinning cup type comprising vertical shaft, cup mounted thereon, second vertical shaft extending into center of cup, cylindrical element mounted vertically on second vertical shaft at end extending into cup, latter shaft being rotatably mounted and provided with torque measuring device, driving means, continuously variable drive interconnecting driving means to cup shaft, etc. No. 2,410,385. Serge Loukomsky and Charles Stock to American Cyanamid Co.

Valve comprising combination of hollow cylindrical valve seat having inlet, outlet and return ports, cylindrical valve head slidably fitting in seat with close tolerance, valve stem in valve head, piston head on valve stem at each end of valve head, etc. No. 2,410,404. J. D. Buchanan.

Agitation and aeration apparatus, impeller disposed in lower portion of body of pulp or the like, propelling device beneath impeller to move settled material or the like upwardly toward impeller and feed same directly thereto, means for conducting air to space below impeller and also below propelling device. No. 2,410,429. Arthur Daman to Mining Process & Patent Co.

Generator burner, fuel vaporizer having imperforate side wall adapted to hold substantial body of liquid fuel, combustion chamber, means for delivering vaporized fuel from interior of fuel vaporizer to interior of combustion chamber, including tubular passage, unitary means for delivering air under pressure to interior of fuel vaporizer and to interior of combustion chamber. No. 2,410,478. James Breese to Oil Devices.

Device for swinging pick-up end of shaker conveyer laterally along ground. No. 2,410,481. Edward Doberstein to Goodman Manufacturing Co.

Means for laterally feeding pick-up end of shaker conveyer. No. 2,410,482. Edward Doberstein to Goodman Manufacturing Co.

Eye protecting device comprising pair of cup-shaped slitted metal eyeshields. No. 2,410,490. Anthony Flocker to Kerlo Corp.

In multiple heater system having plurality of fuel burners each equipped with device for sensing presence of flame in its burner, combination of plurality of electron tubes, means affording corresponding plurality of input circuits one for each tube and each controlled by respective sensing device, etc. No. 2,410,524. Donald Richardson and Robert Yates to Drying Systems, Inc.

In combination with liquid tank having gravity flow discharge pipe at its lower end, level gauge attachment to pipe comprising transparent tube, means connecting upper end of tube to tank, connection between lower end of tube and pipe, pair of valves carried by oppositely acting connections between tank and tube and between tube and pipe, dual spring and weight means for normally maintaining valves closed, etc. No. 2,410,525. Abraham Richolson.

In paint sprayer, elongated nozzle therefor, funnel surrounding nozzle, having pair of spaced walls forming air chamber therebetween, supplying air to chamber, means providing for uniform exit for air all around funnel, means including spiral baffle between walls of funnel, stopping short of one wall, to provide narrow continuous opening between walls. No. 2,410,532. Joseph Tessier.

Prime mover including rotatable structure having therein system of helical passages coaxially disposed around axis of rotation of structure with inlets at one end and outlets at other end of structure for continuous flow of gases through passages, walls of passages being shaped so that passages have along them progressive changes of cross-sectional area whereby each passage comprises an accelerating zone, heating zone and final zone, means for heating gases by fuel combustion throughout at least some of heating zones, etc. No. 2,410,538. George Walton.

In valve structure, valve body having means at one end for receiving flexible conduit, attachment of generally angular shape adapted to be releasably fixed to valve body in plurality of positions, attachment having aperture of fixed size at one end and having clamping means at its other end, etc. No. 2,410,546. Ira McCabe.

Loading pan comprising elongated scoop adapted for attaching to outer end of shaker conveyor for horizontal swinging movement with conveyor. No. 2,410,561. Donald Bailey.

In combination, liquid supply therefor, heating means for container, liquid level impedance change responsive means responding to liquid level changes to and from predetermined normal liquid level in container, second liquid level impedance, change responsive means responding to liquid level changes to and from dangerously low liquid level in container and electronic oscillator controlled by both liquid level means and operatively connected to liquid supply for automatically controlling liquid level, and operatively connected to heating means for shutting same down when liquid level approaches dangerously low level. No. 2,410,568. Theodore Cohen to Wheelco Instruments Co.

In pump, stator having inlet and outlet ports and forming chamber of elliptical section and having opposite end walls and curved side wall, rotor eccentrically journaled in chamber having contact with stator between ports and provided with slot, etc. No. 2,410,596. Aaron Bradford.

Rotary kiln comprising lined rotary drum, plurality of axially spaced, annular members of appreciable width positioned in drum in contact with its lining and rotatable with drum, said members each projecting radially into drum beyond its lining distance which approximately equals depth of material moving through drum, etc. No. 2,410,598. Walter Cliffe.

In magnetic separator, pair of spaced pulleys, one higher than other, carrier, belt for running over pulleys and having lower reach suspended in loosely sagging position therebetween, lower reach areas which are nearer lower pulley sagging in approximate tangency to horizontal while areas nearer higher pulley are inclined more and more upwardly to discharge point, etc. No. 2,410,601. Robert Crockett to Dings Magnetic Separator Co.

In machine having long bed and press actuated by fluid means at opposite ends thereof, wherein it is normally desired to provide said press to remain substantially equidistant from bed at opposite ends thereof, automatic levelling control comprising single fluid pump and conduit means extending parallel into connection with fluid means, etc. No. 2,410,603. Paul Dubosclard.

Apparatus for sizing of suspended solids, comprising means for establishing and maintaining pool of suspended solids to be classified by hindered settling, means for continually feeding solids thereto, means for continually discharging fractionated larger solids from bottom of pool, means for continually overflowing from upper section of pool another fraction of smaller solids, means forming bottom for pool including upper horizontally extending flat plate of impervious material having orifices for distributively delivering controlled quantities of water upflowing therethrough under pressure, etc. No. 2,410,637. George Darby to The Dorr Co.

In pneumatic comparator gauge, body member having fluid space therein, means for supplying gauging fluid thereto, means for controlling discharge from space in accordance with dimensions of work to be gauged, fluid passageway in communication with space, means for indicating pressure in fluid space, fluid pressure responsive member interposed between indicating means and fluid space and controlling discharge through fluid passageway, etc. No. 2,410,671. Coleman Moore to Moore Products Co.

In dehydrator, stationary drum provided with outwardly directed openings in wall thereof, means for creating fire in drum, apparatus for directing air under pressure into drum, rotatable jacket circumscribing drum and providing dehydrating chamber between drum and jacket into which are directed openings, means for rotating drum in direction to move material being treated toward openings whereby air passing from drum through openings is directed against material. No. 2,410,675. Adelbert Nichols, Jr.

Control for hydraulic presses. No. 2,410,712. Earl Cannon to E. W. Bliss Co.

Air and fluid pressure cushion device. No. 2,410,716. Harry Cook, deceased, by Anna Cook, administratrix.

Pressure transformer comprising hydraulic inlet, hydraulic outlet line, manually controlled member comprising small piston and large piston connected together for forcing iquid through outlet line, supply reservoir for member and unloader valve, etc. No. 2,410,750. Edward Rockwell to The New Britain Machine Co.

Pressure actuated valve. No. 2,410,751. Harold Schultz to Bendix Aviation Corp.

Combination with refrigerant evaporator of refrigerant expansion valve for controlling flow of refrigerant medium to evaporator and comprising elongated tubular open ended casing having one end open for admission of refrigerant medium, valve seat member in bore of casing, valve member cooperable with seat member and guided for longitudinal movement in bore, etc. No. 2,410,795. Earnest Dillman to Detroit Lubricator Co.

Moisture ejection device for air pressure systems. No. 2,410,799. Cyrus Bassett to National Pneumatic Co.

In pump, combination of cylinder, pair of heads therefor, piston therein, piston rod extending from cylinder through one of heads of cylinder, pair of frame brackets abutting opposite ends of cylinder heads having lateral extensions to provide support, through bolts on outside of cylinder connecting frame brackets to hold cylinder and two heads and two frame brackets as one stationary device. No. 2,410,808. Niels Christensen.

Welding or brazing rod comprising weld material, and corrosion-resistant metallic film produced by successive strata of metals each having melting point below 800° F. and selected from bismuth, tin, zinc, cadmium, lead and antimony. No. 2,410,850. Rene Wasserman.

In hydraulic system, downward acting plunger having advancing and retracting means, fluid source, valve member movable into first position to connect source with advancing means while simultaneously connecting retracting means with first exhaust conduit or, into second position to connect source with retracting means while connecting advancing means with second exhaust conduit or, into third position to interrupt fluid communication of source with advancing and retracting means, etc. No. 2,410,869. Walter Ernst to The Hydraulic Development Corp., Inc.

Fluid flow control apparatus comprising: pair of pressure fluid operable valves, means connecting one valve in by-passing relation to other, pressure responsive means operatively connected with outlet side of one of valves and operable in accordance with changes in pressure on outlet side, pilot valve means for controlling exhaust and supply of operating fluid from and to pair of valves actuated by pressure responsive means for controlling opening and closing of valves in predetermined order. No. 2,410,876. Donald Griswold.

Mobile steam generator adapted for mounting on auto truck. No. 2,410,900. Raymond Radbill.

Heat transfer construction for electrolytic cells. No. 2,410,952. Lester Lighton to The Electric Storage Battery Co.

In high temperature valve combination comprising housing having fluid conduit and non-fluid conducting portion therein, seat in conduit, valve head mounted for sliding motion in housing to close and open seat, plurality of stuffing boxes in non-fluid conducting portion, plurality of valve head operating means secured to valve head and extending through stuffing boxes to exterior of housing, etc. No. 2,410,960. George Bunn to Phillips Petroleum Co.

Continuous multistage digester unit comprising horizontal rotatable inner and stationary outer imperforate vessels having fluid-tight seals therebetween and means for circulating fluid medium in annular space between vessels, the former of said vessels enclosing digestion space, perforated partition dividing digestion space into separate sections. No. 2,410,964. Joaquin de la Roza, Sr.

Load hoist and grappling control. No. 2,410,965. Henry Dimick to Williamette Hyster Co.

Electric motor and pump assembly comprising cylindrical casing, motor within casing, plurality of circumferentially spaced, separated passages for cooling fluid extending longitudinally of casing and motor and disposed internally of casing and externally of motor, fan mounted on each end of motor shaft adjacent the one end of said passages, etc. No. 2,410,973. Vaino Hoover to Electrical Engineering & Manufacturing Corp.

Packing structure comprising fixed tubular cylinder, barrel reciprocably disposed within cylinder, spaced apart packing sleeves between cylinder and barrel, spring between sleeves for urging same against inner face of cylinder and outer face of barrel, adjusting sleeve surrounding portion of length of barrel, etc. No. 2,410,976. Harry Johns to Velma Johns.

In closed hydraulic system, hydraulic motor unit comprising double acting piston, hydraulic pump unit comprising double acting piston, conduit lines for transmitting fluid under pressure from pump unit to motor unit to operate piston of latter in either direction, closed fluid pressure supply reservoir in fluid communication with system, set of two-way thermal relief valves between reservoir and ends of one of cylinders and set of two way thermal relief valves between both ends of other of cylinders and conduits connected thereto. No. 2,410,978. John Kelly to Adel Precision Products Corp.

In safety device for steam lines, in combination, body having inlet and outlet positioned in line, valve seat in body at outlet, valve comprised of hollow sleeve having relatively large number of perforations therein normally to permit unrestricted flow of steam therethrough closed at one end to form valve disk adjacent valve seat slidably mounted in body, means forming trap for liquids in body adjacent valve, etc. No. 2,410,984. Timothy Lawless.

Combination with steam kettle having inner and outer spaced shells forming steam chamber and steam inlet and condensation outlet, of plurality of reinforcing and heat transferring ribs provided in closely spaced relationship extending upwardly over outer surface of inner shell from common radiating point at its bottom and in vertical planes extending radially of inner shell said ribs extending into steam chamber and having plurality of vanes punched laterally from ribs and forming plurality of closely spaced openings therein said vanes extending angularly and upwardly at 45 degrees from body of ribs, and insulation about outer shell. No. 2,411,006. Renwick Sharp.

Fluid compressing apparatus comprising, cylinder, piston movable in cylinder, piston having plurality of annular grooves in outer side wall thereof, sealing means in outermost grooves and engaging the inner wall of cylinder, wiping means in intermediate groove for engaging inner wall of cylinder, etc. No. 2,411,020. Victor Blasutta to The Denison Engineering Co.

Device for weighing load in elevator car supporting cross beam of framework for which is formed of spaced cross members. No. 2,411,023. William Henry Bruns to Otis Elevator Co.

Drying apparatus comprising combination of drying chamber to receive materials to be dried and absorbing chamber, chambers having common wall, movable door in wall, moisture adsorbing unit and heating element therefor within adsorbing chamber, means for movably supporting adsorbing unit, and means actuated by supporting means when predetermined weight of moisture has been adsorbed by unit to energize heating element, etc. No. 2,411,039. Ralph Heuser.

In direct reading relative humidity meter, deflecting element responsive to difference between wet-air and dry-air temperatures of air to be measured, scale adapted to be varied in length, pointed adjacent to scale constructed and arranged to be deflected over scale proportionally to deflection of element, means to vary length of scale such that sensitivity of indication of pointer relative to scale is in inverse proportion to dry-air temperature in degrees F. less 8° F. No. 2,411,041. Frank Kahn.

In electrolytic timer, receptacle containing electrolyte and having gas trapping chamber in free communication at its lower end with electrolyte, upper end of chamber being closed except for restricted passage opening therefrom, electrical means to decompose electrolyte, means to ignite gases of decomposition and explode them when their product of volume and pressure reaches predetermined amount, passage being closed under normal pressure in chamber but opening for higher pressures created by explosion of gases of decomposition. No. 2,411,089. George Fredericks and Jens Sivertsen to George E. Fredericks Co.

Turbidimeter comprising cell having transparent front wall and light absorbing back wall to contain suspension, turbidity of which is to be measured, means for projecting beam of light through front wall of cell, and photocell provided with aperture and mounted on front wall of cell with its sensitive side in contact therewith and positioned so that beam shines through aperture. No. 2,411,092. Robert Hood and John Berry to American Cyanamid Co.

Fire detecting thermostat comprising support having conical recesses, rod, first bi-metallic coil open to atmosphere and tending to rotate rod in one direction on being subjected to heat, enclosure, second bi-metallic coil encased from atmosphere within enclosure tending to rotate rod in opposite direction on being subjected to heat, normally closed circuit contact normally engaged by free end of second coil, normally opened circuit contact, both ends of rod being conical and mounted in conical recesses so that on movement of first mentioned coil by sudden increase of temperature free end of second coil will break away from engagement with normally closed circuit contact and engage with normally open circuit contact and give alarm of fire. No. 2,411,093. Ronald Jameson.

Temperature measuring device to be inserted in fluid conduit comprising casing constituting part of conduit, annular measuring member located in casing and including material specific electric resistance of which is responsive to variations of temperature, diameter of inner cylindrical face of measuring member being equal to inner diameter of conduit, heat insulating means between casing and outer cylindrical face of measuring member. No. 2,411,120. Hans von Hortenau to Stig Billman.

Mixer to hold mixture of sugar crystals and syrups awaiting centrifugal treatment comprising tank body, gate means to deliver charges of mixture to adjacent centrifugal machines, means inside tank body for heating and stirring mixture, connecting means between tank body and gate means having propulsion means therein to maintain forced circulation of mixture from heating means to face of gate means. No. 2,411,138. Eugene Roberts to The Western States Machine Co.

Explosives

Apparatus for feeding and delivering ammunition blanks. No. 2,409,657. Edwin Birdsall to Remington Arms Co., Inc.

Nonleak liquid explosive filler system for ammunition. No. 2,409,858. Nevil Hopkins, Raymonde Hopkins, executrix of said Nevil Hopkins, deceased, to Raymonde Hopkins, Samuel Lloyd and Murray Quigg, as trustees.

Manufacture of low density blasting explosives comprises emulsifying molten easily fusible organic explosive with assistance of emulsifying agent in aqueous medium that comprises saturated solution of ammonium nitrate carrying solid ammonium nitrate in suspension and is free from readily hydratable salts. No. 2,409,919. John Whetstone to Imperial Chemical Industries, Ltd.

In shell, grenade body containing explosive material, nose frame secured to body, fuse connection between interior of body and nose frame, impact member mounted in end of frame to project therefrom for axial inward movement upon impact, impact element containing explosive and having firing cap therefor, etc. No. 2,409,945. William Lowes to Harris Trust & Savings Bank.

Food

Hydrobleaching glyceride oils to form edible products having minimum of unsaponifiable components and improved color and stability. No. 2,410,102. William Paterson to Lever Brothers Co.

Casing for food products, formed of strip of parchmentized paper having edges sewn together and having longitudinal internal tubular welt. No. 2,410,206. Alpheus Freeman to Glenn Noble.

Manufacturing starch conversion syrup consists in subjecting aqueous starch suspension to hydrolysis to provide starch conversion liquor having dextrose equivalent of between 45-55 per cent, improvement comprises subjecting liquor to dialysis against water through semi-permeable membrane, recovering dialyzate having dextrose equivalent greater than 55 per cent. No. 2,410,264. Frank Brock and Clifford Smith to A. E. Staley Manufacturing Co.

Homogeneous edible composition containing both mineral and vitamin nutrient components, comprising at least one water-soluble vitamin normally deteriorative and incompatible with minerals, individual particles of which are protected with moisture and air resistant film-forming water-insoluble plastic inert with respect to vitamin and effecting physical separation of coated vitamin from mineral and from any other components with which vitamin is incompatible. No. 2,410,417. Carl Andersen to Lever Brothers Co.

Preserving glyceride oil containing vitamins comprises emulsifying them in molasses and heating to over 150° F. for enhancement of antioxygenic effect. No. 2,410,455. Sidney Musher to Musher Foundation, Inc.

Inorganic

Producing sulfate of ammonia by scrubbing contact of distillation gas with sulfuric acid liquor. No. 2,409,790. Carl Otto to Fuel Refining Corp.

Making elemental selenium of high purity, comprises introducing selenium

dioxide in finely sub-divided form into reaction chamber, introducing at least stoichiometric-amount of ammonia into reaction chamber, maintaining reaction chamber at temperature at least as high as sublimation temperature of selenium dioxide, etc. No. 2,409,835. Charles Clark, Eugene Elkin and George Waitkins to Canadian Copper Refiners, Ltd.

Recovering magnesium ions in relatively concentrated form from brine containing between 0.01 and 0.8 gram atomic weight per liter of same and at least equimolecular proportion of alkali metal salt, steps of passing brine over alkali metal salt of carboxylated resin, etc. No. 2,409,-861. Melvin Hunter and William Bauman to The Dow Chemical Co.

Generation of chlorine dioxide by reacting hydrochloric acid with chlorine-containing compound of class consisting of chlorites and chlorates of alkali and alkaline earth metals, improvement comprises reacting hydrochloric acid, in gaseous form and in admixture with inert diluent gas, with chlorine-containing compound in solid form. No. 2,409,862. Willis Hutchinson to The Mathieson Alkali Works, Inc.

Electrolytic alkali-chlorine cell cathode structure comprising liquid-retaining wall carrying cell current and thin, elongated, hollow foraminous cathodic electrode projecting therefrom and cooperating with pair of electrically interconnected anodic electrodes on each side thereof, etc. No. 2,409,912. Kenneth Stuart to Hooker Electrochemical Co.

Electrodeposition of indium comprises passing electric current through electrolyte composed of aqueous acid solution containing indium fluoborate, indium fluosilicate, or indium fluoride. No. 2,409,983. William Martz to General Motors Corp.

Cyclic process for producing calcium fluoride consisting in absorbing gases containing silicon tetrafluoride in water to produce hydrofluosilicic acid and silica, separating acid solution from silica, continuously evolving gaseous fluorine compounds from solution by heat and evaporation, recirculating solution thus partially freed from fluorine in order to absorb additional quantities of silicon tetrafluoride, etc. No. 2,410,-043. Ernest Breton and William Waggaman to the Secretary of the Interior of the United States of America.

Obtaining water-soluble titanium oxygen compound comprising reacting titanium halide with tertiary alcohol. No. 2,410,119. Ray McCleary to E. I. du Pont de Nemours & Co.

Plant for burning limestone comprising pair of rotary cylindrical kilns arranged in side by side order with their material-receiving and discharging ends reversed, crushing means for receiving heated materials discharged from kilns to reduce particle or lump size thereof, receiver for unheated limestone of relatively coarse particle or lump size, conveying apparatus arranged for reception and intermingling of unheated coarse materials discharged from receiver and relatively highly heated fine materials discharged from crushing means, etc. No. 2,410,235. Warford Reaney.

Lubricating relatively moving metallic bodies comprises maintaining between their bearing surfaces lubricant film comprising liquid polymeric organosiloxane whose organic substituents consist of lower alkyl and phenyl radicals attached to silicon through carbon-silicon linkages. No. 2,410,346. James Hyde to Corning Glass Works.

Reacting $SbCl_5$ with HF to produce SbF_5 in aluminum apparatus. No. 2,410,358. Melvin Perkins and Carl Irwin to E. I. du Pont de Nemours & Co.

Producing catalysts comprises mixing precipitated and purified hydrated alumina with 1% to 10% by weight of ammonium salt, dispersing resultant mixture in aqueous medium to form alumina hydrosol, adding to hydrosol metal compound soluble in aqueous medium and capable of yielding catalytically active metal oxide upon heating, evaporating resultant mixture to dryness, heating resultant residual material to convert compound to metal oxide. No. 2,410,558. Glenn Webb and Marvin Smith to Universal Oil Products Co.

Plating copper onto ferrous metal surface comprises contacting surface with heated aqueous solution containing soluble copper salt of polyhydroxythiol, and acid selected from sulfuric, hydrochloric and phosphoric acids. No. 2,410,844. Frank Signaigo and William Peppel to E. I. du Pont de Nemours & Co.

Forming catalyst suitable for promoting reduction of nitro aromatic compounds comprises mixing 17 parts of MgO with 30 parts of ZnO, and 53 parts of MoO_3, adding water to make paste, drying paste at 250° F. extruding paste to form shaped bodies, sulfiding catalyst by treating with volatile sulfide at 850° F. to 900° F. at one atmosphere pressure until catalyst acquires from 15-25 weight per cent of sulfur. No. 2,410,890. Ralph Mason to Standard Oil Development Co.

Preparing normal lead salicylate comprises forming aqueous suspension of lead oxide and while agitating same gradually adding thereto powdered salicylic acid until pH of suspension is lowered to 4.4. No. 2,410,-977. Leonard Kebrich to National Lead Co.

Medicinal

Recovery of heparin from animal tissue, steps of finely subdividing tissue, heating tissue in mixture with water to 30° to 50° C., maintaining mixture at 20° to 25° C. until autolysis is substantially completed, extracting mixture with dilute aqueous alkali and ammonium sulfate, acidifying extract to precipitate crude heparin, etc. No. 2,410,084. Marvin Kuizenga to The Upjohn Co.

Producing vitamin D by antirachitically activating mixture of sterols, at least thirty per cent by weight of which is provitamin D and at least twenty per cent by weight of which is inactivatable sterol, etc. No. 2,410,254. James Waddell and Warren Woessner to E. I. du Pont de Nemours & Co.

Sifter package for pharmaceuticals. No. 2,410,438. Mack Fields to Abbott Laboratories.

Preparing vitamin B_6, steps comprising treating 2-methyl-3-alkoxy-4,5-bis (aminomethyl) -pyridine with hydrobromic acid as dealkylating agent to form 2-methyl-3-hydroxy-4,5-bis (aminomethyl) -pyridine, and reacting resulting 2-methyl-3-hydroxy-4,5-bis (aminomethyl) -pyridine with agent selected from nitrous acid and products capable of splitting off nitrous acid as deaminating agent to form vitamin B_6. No. 2,410,531. Lester Szabo to Wyeth, Inc.

Treating anhydro vitamin A with organic acidic substance in medium containing appreciable amount of water until anhydro vitamin A has been at least partially converted into vitamin A-active material having higher potency and recovering vitamin A-active material from reaction mixture. No. 2,410,575. Norris Embree and Edgar Shantz to Distillation Products, Inc.

Preparing fat-soluble vitamin concentrate comprises reacting glyceride fat which contains fat-soluble vitamin with at least approximately stoichiometric amounts of member of group consisting of primary amines, secondary amines, and quaternary ammonium bases, until all fatty acids of glyceride have combined therewith and separating vitamin in concentrated form from reaction mixture. No. 2,410,590. Edgar Shantz to Distillation Products, Inc.

New product an alkyl ether of vitamin D. No. 2,410,893. Nicholas Milas to Research Corp.

Metallurgy, Ores

Removing ferruginous impurities from industrial sands consists in subjecting sands to first froth-flotation treatment in presence of fatty acid compound having hydrocarbon radical of at least 12 carbon atoms, alkali and mineral oil, removing and discarding froth; subjecting pulp residue to second froth-flotation treatment in presence of cooperating agents consisting of less than six pounds of mineral acid and less than one pound of cationic-active nitrogenous compound containing alkyl group which contains from 7 to 19 carbon atoms. No. 2,409,665. Allen Cole and James Duke and Lynn McMurray to Minerals Separation North American Corp.

In process of beneficiating silicious iron ore by cationically froth-floating silicious gangue particles from iron mineral particles of aqueous pulp of such an ore by use of higher molecular weight aliphatic amine collector and frother, step of accelerating rate of flotation of silicious gangue particles by incorporating small amount of sodium sulfide into pulp prior to froth flotation step. No. 2,410,021. Fred De Vaney to Erie Mining Co.

Treating chromite ore to facilitate recovery of chromium comprises placing ore in finely divided form adjacent anode of electrolytic cell having aqueous alkaline solution of alkali metal halate, passing direct current of electricity through cell to transform ore adjacent anode into chromium compounds soluble in solution and non-chromium compounds insoluble in solution. No. 2,410,242. Joseph Schulein.

Removal of nitrogen from carbothermic magnesia including magnesium nitride as impurity, magnesia being obtained in the carbothermic process for making magnesium metal wherein nitrogen gas is present and available for reaction with condensing magnesium. No. 2,410,267. Alva Byrns to The Permanente Metals Corp.

Beneficiating oxidized iron ores by froth flotation of ore in form of aqueous pulp. No. 2,410,376. Robert Booth and Earl Herkenhoff to American Cyanamid Co.

Beneficiating oxidized iron ores by froth flotation comprises conditioning ore at high solids with acid substance, etc. No. 2,410,377. Robert Booth and Earl Herkenhoff to American Cyanamid Co.

Beneficiating fluorite-containing ores, comprises subjecting aqueous pulp of such ores to froth flotation in presence of from 0.2 to 5.0 lbs./ton of ore of collector comprising water-soluble product selected from sulfonates of green acid type obtained in refining of petroleum lubricating oils and soaps and water-soluble salts of such sulfonates. No. 2,410,770. Robert Booth and Joseph Carpenter to American Cyanamid Co.

Apparatus for sintering ore comprises, driven variable speed reducer having driving means and means to change driving speed of said driving means, sintering machine driven by driving means, sintering machine having closed hood, windbox and blower mechanism to draw air into hood chamber, etc. No. 2,410,944. Walter Johnson to American Smelting & Refining Co.

Organic

Preserving organic substances which tend to deteriorate by absorption of oxygen from air comprises incorporating therein product of reaction at 100°C. to 200°C. in presence of acidic catalyst of monomeric 1,3 butadiene hydrocarbon and primary aromatic polyamine compound, said amino groups being primary amino groups, proportion of butadiene in reaction mix being in molecular excess compared to molecular proportion of amine. No. 22,808. Louis Howland and Philip Paul to United States Rubber Co.

Amino alcohol esters of alkyl-substituted alkoxy benzoic acids. No. 2,-409,663. Walter Christiansen and Sidney Harris to E. R. Squibb & Sons.

Oil-soluble polyalkyl aromatic sulfonate consists of substantially oil soluble polyamyl naphthalene sulfonate having one metal sulfonate radical carried by unalkylated position of aromatic ring and having at least three amyl radicals. No. 2,409,671. Jacob Faust to L. Sonneborn Sons, Inc.

Preparation of di(aminoalkyl) acetal comprises heating acetal with aldehyde cyanohydrin whereby unsymmetrical cyanoalkyl acetal is obtained, heating cyanoalkyl acetal with hydrogen in presence of ammonia and hydrogenation catalyst to form unsymmetrical aminoalkyl acetal, subjecting separated unsymmetrical aminoalkyl acetal to reaction with excess of inorganic acid, neutralizing salt obtained with base, removing from mixture after filtration di(aminoalkyl) acetal. No. 2,409,675. William Gresham to E. I. du Pont de Nemours & Co.

Synthesis of indole steps comprise heating o-ethylaniline in presence of solid dehydrogenation catalyst at 550° to 750° C., condensing from resultant gaseous mixture reaction product containing indole and unreacted o-ethylaniline. No. 2,409,676. William Gresham and Walter Bruner to E. I. du Pont de Nemours & Co.

Preparation of heavy metal salts of organic acid, step comprises reacting heavy metal with compound selected from organic acids containing unsaturation and at least 8 carbon atoms and their esters in presence of oxygen and antioxidant selected from para-hydroxy-diphenyl phenols, hydroquinone, para-aminophenol, etc. No. 2,409,678. Clement Hamblet to E. I du Pont de Nemours & Co.

Addition product of alkylene imine having its imino nitrogen atom attached to two carbon atoms directly connected one to another, with zinc salt of heterocyclic nitrogen-containing mercaptan. No. 2,409,685. Paul Jones and Roger Mathes to The B. F. Goodrich Co.

New composition of matter oil-soluble sulfur containing product obtained by reacting elemental sulfur with compound of formula described in patent. No. 2,409,687. Dilworth Rogers and John McNab to Standard Oil Development Co.

Preparation of cyanomethyl dialkyl orthoformates. No. 2,409,699. Donald Loder and William Gresham to E. I. du Pont de Nemours & Co.

Preparing alkyl isocyanates steps comprise heating N-alkyl carbamic alkyl ester to 135° to 500° C. and immediately separating resulting alkyl isocyanate from pyrolysis products before said products have had time to reunite to form N-alkyl carbamic alkyl ester. No. 2,409,712. Carl Schweitzer to E. I. du Pont de Nemours & Co.

Diphenylene hydantoin of formula described in patent. No. 2,409,754. Henry Henze to Parke, Davis & Co.

Compounds of cyclopentanopolyhydrophenanthrene series and process of making same. No. 2,409,798. Tadeus Reichstein.

Additional patents on all other classifications from the above volumes will be given next month.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada

CANADIAN PATENTS

Granted and Published November 19, 1946

Removable adhesive sheet comprising a fibrous backing material having a tacky coating thereon comprising by weight 97 per cent to 30 per cent of polyisobutylene and 3 to 10 per cent of an anti-adhesive transfer agent, from the group consisting of dibutyl phthalate, dibutyl sebacate, stearic acid and dioctyl phthalate, and up to 60 per cent mineral oil as an extender. No. 438,032. Canadian Industries, Ltd. (George William Yule).

Manufacture of a hydantoin by preparing a non-alkaline mixture of hydrocyanic acid and a ketone and reacting with an aqueous solution of ammonium carbonate. No. 438,040. Canadian Industries, Ltd. (Arthur Osmond Rogers).

Process of curing an interpolymer of ethylene and an organic monocarboxylic acid ester of vinyl alcohol. No. 438,041. Canadian Industries, Ltd. (Ambrose McAlevy, Daniel Eugene Strain and Franklin Sewell Chance, Jr.).

Production of refractory furnace linings by mixing with a mass of magnesia-containing particles dilute sulphuric acid and a water-insoluble sulphate and moulding and pressing the mixture into form. No. 438,046. Canadian Refractories, Ltd. (The Honorary Advisory Council for Scientific and Industrial Research, John Samuel Clifford Perry and Alan Theodore Prince).

Process for the manufacture of azo-dyestuffs containing at least 3 azo-groups. No. 438,065. Ciba, Ltd. (Fritz Straub, Peter Pieth, Walter Anderau and Walter Hanhart).

Vat dyestuff of the fluoranthene series. No. 438,066. Ciba, Ltd. (Walter Kern, Theodor Holbro and Richard Tobler).

Process for the production of a new azo dye which comprises coupling a diazotized 4-alkoxy-2-amino-benzthiazole with an azo coupling component. No. 438,138. Claude George Bonard (Christopher Stanley Argyle).

New industrial product made by spinning a mixture containing 55 per cent to 95 per cent in weight of kapok fibres and 45 per cent to 5 per cent in weight of artificial silk "rayon" fibres. No. 438,139. Societe Files "Textiler" (Raul Pateras Pescara).

Granted and Published November 26, 1946

Laminated material consisting of a textile core and high tensile steel wires impregnated with synthetic resin, and a wood veneer secured to each face of the core by means of a synthetic resin adhesive. No. 438,155. William Yarworth Jones.

Method of treating magnesia base waste sulphite pulp liquor containing calcium impurities and combustible organic matter from a cyclic process for the manufacture of pulp. No. 438,173. George H. Tomlinson.

Sifter package for pharmaceuticals. No. 438,176. Abbott Laboratories (Mack R. Fields).

Colour producing composition which comprises an ice colour coupling component and a stabilized diazo compound. No. 438,180. American Cyanamid Company (Hans Z. Lecher, Frederic H. Adams and Henry Philip Orem).

Colour producing composition which comprises an ice color coupling component and a stabilized diazo compound having the general formula $X\text{-}(N{=}N\text{-}G)_n$. No. 438,181. American Cyanamid Company (Hans Z. Lecher, Robert P. Parker and Henry Philip Orem).

Process of producing an extreme yellow shade of barium Lithol red. No. 438,182. American Cyanamid Company (Clifton C. Candee).

Process for preparing a merocyanine dye containing a selenocarbonyl group comprising treating with a metal selenide, a quaternary salt dye. No. 438,200. Canadian Kodak Co., Ltd. (Leslie G. S. Brooker and Robert H. Sprague).

Process for preparing a thioketone. No. 438,201. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker and Grafton H. Keyes).

Insect repellent composition containing an inert diluent and a repellent containing dibutyl dl-malate said diluent containing a vegetable oil. No. 438,210. Canadian National Carbon Company, Ltd. (Philip Granett).

Purification of aqueous solutions of the halides of alkali metals and the alkaline earth metals including magnesium, said precipitating the heavy metal impurities by adding a chlorite of the group consisting of the alkali and alkaline earth metal chlorites. No. 438,215. The Consolidated Mining and Smelting Company of Canada, Ltd. (Clifford A. Hampel and John E. Weiler).

An N-carbamyl thiazyl sulphamine resulting from reacting a urea and a thiazyl sulphur halide with elimination of hydrogen halide. No. 438,217. Dominion Rubber Company, Ltd. (William Henry Ebelke).

N-substituted aminonaphthol dye intermediate. No. 438,219. E. I. du Pont de Nemours & Co. (James Emory Kirby and David W. Woodward).

Removing silica from water by intimately mixing and agitating the water at a temperature above 50° C. with an accumulation of a silica absorbing magnesium compound. No. 438,243. The Permutit Company (Paul Cudell Goetz).

Method of improving the stability of an image formed of iodine contained in a high polymer having a plurality of hydroxyl groups, which comprises treating the high polymer and the image with an aqueous solution of a water-soluble boron compound. No. 438,248. Polaroid Corporation (Edwin Herbert Land).

Process of electrolytically depositing iron and iron-nickel alloys. No. 438,249. Pyrene Manufacturing Company of Canada, Ltd. (Louis J. Donroe).

Process of manufacturing ethyl chloride from a hydrocarbon mixture predominating in ethane and ethylene. No. 438,254. Shell Development Company (William E. Vaughan and Frederick F. Rust).

Process of chlorinating propylene via substitution by reacting propylene in the vapour phase with gaseous chlorine in the presence of oxygen. No. 438,255. Shell Development Company (Frederick F. Rust and William E. Vaughan).

Production of the methyl ether of glycerine monochlorhydrin by reacting epichlorhydrin with methyl alcohol in the presence of hydrofluoric acid. No. 438,256. Shell Development Company (Kenneth E. Marple, Edward C. Shokal and Theodore W. Evans).

Reacting 2-chlorbutene-2 in the liquid phase with chlorine under the influence of light and in the deliberate presence of oxygen and then recovering 2, 3-dichlobutene-1. No. 438,257. Shell Development Company (George W. Hearne).

Production of a hydroxy ether by reacting epichlorhydrin with isopropyl alcohol in the presence of stannic chloride. No. 438,258. Shell Development Company (Kenneth E. Marple, Edward C. Shokal and Theodore W. Evans).

Continuous process for producing cyclopentylchloride. No. 438,259. Shell Development Company (William A. Bailey, Jr., and Summer H. McAllister).

Production of an aryl ether of glycerol by reacting phenol with sodium hydroxite to form sodium phenolate and subsequently reacting with mono-isopropyl ether of glycerol monochlorhydrin. No. 438,260. Shell Development Company (Kenneth E. Marple and Theodore W. Evans).

An ether of a cyclic ketal of a mono ether of a trihydric alcohol and a ketone containing at least 8 carbon atoms. No. 438,262. Shell Development Company (Kenneth E. Marple).

A film comprising a continuous layer of an alkali-soluble water-insoluble cellulose ether having embedded therein an open mesh textile web to increase tear resistance and tensile strength. No. 438,264. Sylvania Industrial Corporation (James Andrew Clark).

Producing finely-divided calcium sulphite for filler and pigment purposes by precipitating calcium sulphite from a lime bearing suspension by reaction with sulphite ions and subjecting the precipitate to treatment with an acid. No. 438,282. West Virginia Pulp & Paper Company (Gerald Haywood and Wright M. Welton).

Process for the production of cellulose acetate of improved stability. No. 438,287. Camille Dreyfus (Robert D. Rowley).

Process for purifying cellulose esters of higher fatty acids which are contaminated with free higher fatty acid and with cellulosic impurities. No. 438,288. Claude George Bonard (James Wotherspoon Fisher).

Granted and Published December 3, 1946

Rendering the internal compartment walls of metal tanks (such as cargo tanks) resistant to corrosion by washing the interior of the tank, and releasing ammonium hydroxide into the compartment within the tank. No. 438,297. Peter Heidt.

Laminated article comprising fibrous skin laminae bonded together by an adhesive consisting chiefly of a synthetic resin which is thermosetting and fibrous core laminae bonded together by an adhesive which is thermopolastic. No. 438,298. Bruno Jablonsky.

Process for comminuting natural cellulosic materials. No. 438,312. Matthew J. Stacom.

Producing chlorine dioxide by reducing a metal chlorate by means of a (primary) reducing agent of such a character as not to effect any substantial reduction of the chlorine dioxide produced reducing the oxidized form of the primary reducing agent and returning it to the process. No. 438,316. Aktiebolaget Duba (Sven Helmer Persson).

Manufacture of calcium acid sulphide by forming a suspension of lime in petroleum naphtha incorporating water in said suspension and intimately contacting the resulting slurry with hydrogen sulphide. No. 438,318. The Atlantic Refining Company (Russell C. Hartman).

Recovering sulphur values from sulphuric acid sludges which are insufficiently fluid to be readily pumped by subjecting the sludge to direct contact with steam and heating in the presence of added carbonaceous material to cause the evolution of sulphur dioxide. No. 438,319. The Atlantic Refining Company (William K. Griesinger).

Producing a catalyst composition by reacting in aqueous solution, sodium silicate with an excess of magnesium chloride to form a water-insoluble magnesium silicate and treating said magnesium silicate with an aqueous solution of calcium chloride. No. 438,320. Attapulgus Clay Company (William A. La Lande, Jr.).

Process for improving the adsorptive and bleaching efficiency of Georgia-Florida type fuller's earth. No. 438,321. Attapulgus Clay Company (William A. La Lande, Jr.).

Alloy containing 2 to 6 per cent copper, 0.1 to 1 per cent beryllium, 0.65 to 6.5 cobalt, with the remainder substantially all aluminum, the cobalt and beryllium being in the critical ration of 6.5:1. No. 438,335. Canadian General Electric Company, Ltd. (Richards H. Harrington).

Abrasive composition of matter consisting of a metallic body having small sized diamond particles dispersed therethrough said metallic body being comprised of a sintered mixture of metal powders consisting of .20 to .30 per cent Au and Ag, .10 per cent Indium, 5 per cent Mn, balance Fe containing about .87 per cent C. No. 438,346. Fish-Schurman Corporation (Hermann Kott).

Silver halide emulsion for colour photography containing as a colour former a 3.5-di (acetylaceto)-1-phenyl guanazole free from colour-forming phenolic hydroxyl groups. No. 438,349. General Aniline & Film Corporation (Abraham Bavley).

Inhibiting corrosion of magnesium in contact with methyl alcohol which comprises treating the magnesium-containing surface with such alcoholic liquid including an acid from the group consisting of palmitic, oleic and stearic acids, together with ammonia. No. 438,356. Magnesium Elektron, Ltd. (Charles James Bushrod).

(To be continued)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

424,800. Columbia Naval Stores Co., Savannah, Ga.; filed Feb. 6, 1945; Serial No. 479,466; for gum rosin; since Jan. 1, 1945.

424,809. Protective Coatings Corp., Belleville, N. J.; filed June 20, 1945; Serial No. 484,799; for water impervious textile fabrics of cotton, rayon, silk, wool, nylon, glass, protein and cellulose derivative filaments; since Mar. 23, 1944.

424,819. Lydia E. Meyer, as L. E. Meyer, Fresno, Calif.; filed Sept. 11, 1945; Serial No. 488,276; for liquid cleaner for walls, floors, furniture; since Aug. 25, 1945.

424,822. Dominion Chemical Co., Inc., New York, N. Y.; filed Nov. 24, 1945; Serial No. 492,131; for chemical compound for use in removal of soot; since July 1936.

424,828. Edgar M. Butler, as Butler Engineering Co., New Orleans, La.; filed Dec. 26, 1945; Serial No. 493,882; for chemical preparation for removing sludge from oil; since Oct. 20, 1944.

425,029. Sewall Paint & Varnish Co., Kansas City, Mo.; filed Apr. 2, 1945; Serial No. 481,653; for paints in paste or semi-paste form; since October 1944.

425,088. Crest Fabrics Corp., New York, N. Y.; filed Apr. 10, 1946; Serial No. 499,944; for vinyl type plastic sheeting; since July 9, 1945.

425,222. Marwin Dyestuff Corp., Jersey City, N. J.; filed Dec. 4, 1945; Serial No. 492,637; for dyestuff; since Feb. 28, 1940.

425,361. Minnesota Mining & Manufacturing Co., St. Paul, Minn.; filed Oct. 30, 1943; Serial No. 464,543; for self-adherent moisture-proof, oil-resistant, flexible composite wrapping sheet; since Nov. 5, 1942.

425,388. Sicca Soya Paint Co., Inc., Peoria, Ill.; filed Dec. 22, 1945; Serial No. 493,835; for synthetic resin decorative paint coating composition; since Jan. 1, 1942.

425,390. John G. Hollin as International Export Co., San Francisco, Calif.; filed Jan. 30, 1946; Serial No. 495,673; for ready mixed paints; since Jan. 25, 1941.

471,024. The Dill Co., Norristown, Pa., to Killer Diller Corp., Milwaukee, Wis.; filed June 8, 1944; for insecticides; since Apr. 13, 1944.

471,128. Nu-Pro Manufacturing Co., St. Louis, Mo.; filed June 10, 1944; for cleaning sticks of detergent material; since May 1, 1944.

480,590. Lee Rubber & Tire Corp., Youngstown, Ohio; filed Mar. 7, 1945; for hose, belting, and packing; since June 15, 1927.

483,703. Trojan Products & Mfg. Co., Chicago, Ill., to The Diversey Corp., Chicago, Ill.; filed May 23, 1945; for hand soap, polish for refinishing and cleansing metal, wood and other surfaces; since October 1923.

483,784. Plant Products Co., Blue Point, N. Y., to Plant Products Corp., Blue Point, N. Y.; filed May 25, 1945; for insecticides used for spraying plants; since Dec. 18, 1944.

484,058. National Starch Products, Inc., New York, N. Y.; filed June 1, 1945; for sizings for textiles and paper, glues and pastes; since May 1, 1945.

489,178. Charles A. Jensen, as Midland Manufacturing Co., Buffalo, N. Y.; filed Sept. 29, 1945; for penetrating oil to release and remove corrosion; since Sept. 8, 1945.

489,458. General Laboratories, Inc., St. Louis, Mo.; filed Oct. 5, 1945; for special enzyme for inversion of sucrose, or beet sugar, to dextrose and levulose; since June 17, 1944.

489,983. Plastron, Inc., New York, N. Y.; filed Oct. 15, 1945; for plastic film of polyvinyl chloride; since Aug. 1, 1945.

490,889. Kendall Refining Co., Bradford, Pa.; filed Nov. 1, 1945; for viscous oils and petrolatum waxes; since Aug. 11, 1945.

491,480. Samuel T. Kantor, as Gotham Ink & Color Co., Long Island City, N. Y.; filed Nov. 13, 1945; for rotogravure inks, coatings and varnishes for rotogravure application; since Sept. 6, 1945.

492,473. Samuel Stein, as Chemical Industries, and Stynamite Co., San Francisco, Calif.; filed Nov. 30, 1945; for liquid chemical cleaning preparation; since Feb. 1, 1940.

492,535. Witco Chemical Co., Chicago, Ill.; filed Dec. 1, 1945; for asphaltic compound used in waterproofing and sealing; since Aug. 13, 1945.

492,565. Knox Chemical Co., Chicago, Ill.; filed Dec. 3, 1945; for insecticides; since Sept. 15, 1944.

493,984. John T. Stanley Co., Inc., New York, N. Y.; filed Dec. 28, 1945; for wetting agent and cleanser; since June 11, 1945.

494,471. Union Chemical & Oil Co., Chicago, Ill.; filed Jan. 8, 1946; for waterproof roof paint; since May 1937.

494,771. Alfred Aufhauser, as Industrial Raw Materials Co., New York, N. Y., to Industrial Raw Materials Corp., New York, N. Y.; filed Jan. 15, 1946; for petroleum wax in powdered form; since November 1945.

495,210. Barnstead Still & Sterilizer Co., Boston, Mass.; filed Jan. 23, 1946; for water demineralizing apparatus of filter type; since Oct. 27, 1945.

496,248. The Lubrizol Corp., Wickliffe, Ohio; filed Feb. 8, 1946; for chemical compounds as improving agents for lubricants and internal combustion engine fuels; since Jan. 16, 1946.

496,516. Nukem Products Corp., Buffalo, N. Y.; filed Feb. 13, 1946; for acid and alkali proof plastic paint product; since Nov. 15, 1945.

496,908. The A. S. Harrison Co., New York, N. Y.; filed Feb. 19, 1946; for cleaning and waxing preparations; since Sept. 11, 1942.

497,090. General Solvents Sales Co., Inc., Rochester, N. Y.; filed Feb. 23, 1946; for liquid solvent for removing tar, wax, oil and grease from metal; since Dec. 7, 1945.

497,671. John W. Masury & Son, Inc., Baltimore, Md.; filed Mar. 5, 1946; for paints and wood fillers; since Nov. 24, 1895.

497,767. The American Varnish Co., Chicago, Ill.; filed Mar. 7, 1946; for linoleum lacquer; since 1925.

498,253. The Procter & Gamble Co., Cincinnati, Ohio; filed Mar. 14, 1946; for sudsing cleaner and detergent; since Feb. 29, 1932.

498,307. Parker Rust Proof Co., Detroit, Mich.; filed Mar. 15, 1946; for chemicals used in metal treatment; since Aug. 22, 1945.

498,322. Standard Oil Co. of California, Wilmington, Del., and San Francisco, Calif.; filed Mar. 15, 1946; for chemical to prevent freezing of moisture; since Dec. 16, 1943.

498,591. Clinton Industries, Inc., Clinton, Iowa; filed Mar. 20, 1946; for refined corn sugar, used in manufacture of glassine paper, textiles, and pharmaceuticals; since June 1936.

498,888. Edward M. Davidson, New York, N. Y.; filed Mar. 25, 1946; for liquid preparation for coating soft or hard rubber to preserve life thereof; since June 26, 1943.

499,519. Titanine, Inc., Union, N. J.; filed Apr. 2, 1946; for liquid cement having organic base; since Mar. 14, 1946.

499,520. Titanine, Inc., Union, N. J.; filed Apr. 2, 1946; for liquid cement having organic base; since Mar. 14, 1946.

499,996. Dorsett-Jones, Inc., Baltimore, Md.; filed April 11, 1946; for insecticides and insect sprays of residual and contact types; since Feb. 27, 1946.

500,002. General Chemical Co., New York, N. Y.; filed Apr. 11, 1946; for insecticides; since Mar. 4, 1946.

505,576. The B. F. Goodrich Co., New York, N. Y., and Akron, Ohio; filed July 13, 1946; for adhesives in solid and liquid form; since 1890.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, October 22 - November 12.

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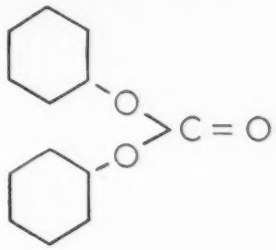
Structural Formula:



Physical Properties:

Appearance: white crystalline solid, white needles from alcohol.

Molecular Weight: 214.
Melting Point: 78° C.
Boiling Point: 302° C.
Specific Gravity:
Liquid 1.122 at 87° C.
Solid 1.272 at 14° C.

Chemical Properties:

1. Can be halogenated and nitrated in characteristic manner.

2. Readily undergoes hydrolysis and ammonolysis when treated respectively with inorganic bases, ammonia and amines.

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Quite soluble in acetone, hot alcohol, benzene, carbon tetrachloride, ether, glacial acetic acid, and many other organic solvents.

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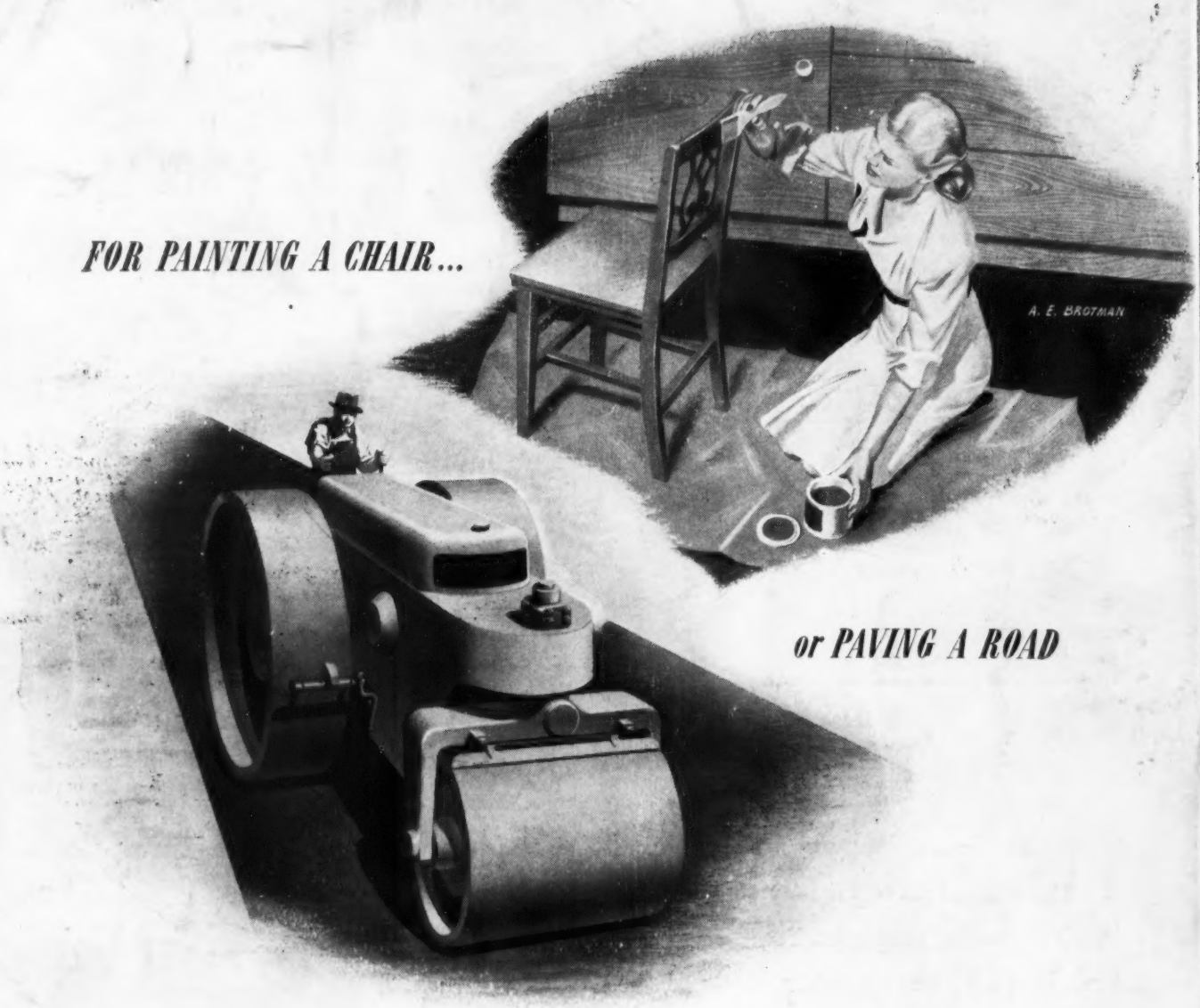

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